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ABSTRACT

OF THE PROCEEDINGS OF THE

LINNAEAN SOCIETY

OF NEW YORK CITY,

FOR THE OFFICIAL YEAR 1888-89.

OFFICERS.

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| <i>President,</i> | GEORGE B. SENNETT. |
| <i>Vice-President,</i> | FRANK M. CHAPMAN. |
| <i>Recording Secretary,</i> | JONATHAN DWIGHT, JR. |
| <i>Corresponding Sec. and Treasurer,</i> | NEWBOLD T. LAWRENCE. |

The Society meets the first and third Friday evenings of each month at the rooms of the Geographical Society, No. 11 West 29th Street.

VI
[From 'THE AUK,' Vol. IV, No. 2, pp. 196-204, April, 1889.]

SCIENTIFIC SOCIETIES.

Linnæan Society of New York.

THE Society has issued no regular publications since August, 1884, when Vol. II of the 'Transactions' was published. Many papers read before the Society have been printed in 'The Auk,' 'Forest and Stream,' and elsewhere. The following is a résumé of the Proceedings for the official year 1888-89.

April 13, 1888.—Mr. Frank M. Chapman, Vice-President, in the chair.

Mr. L. S. Foster presented a paper giving a chronological sketch of the life of John James Audubon.

Mr. William Dutcher reported the capture of a Wilson's Plover (*Ægialitis wilsonia*) several years ago on Long Island. He read a letter from Mr. George Lane, an intelligent and observant gunner from the same locality, stating that about two weeks ago he had seen a bunch of these birds bound east.

Mr. Chapman spoke of the immense size of the flocks of Shore-birds seen on the west coast of Florida, particularly one of Knots (*Tringa canutus*), which were very tame.

A number of specimens of Shore-birds were exhibited by Mr. Jonathan Dwight, Jr.

May, 11, 1888.—Mr. Newbold T. Lawrence, Treasurer, in the chair.

An invitation was received from the Linnæan Society of London to attend its centenary the present month.

Mr. L. S. Foster read 'Notes upon the migrating birds of the spring of 1888 as observed near Van Cortlandt, N. Y., and at Woodside, Long Island.'

A discussion of the effects of the 'blizzard' of March 12 of the present year upon avian life developed evidence as to the extensive destruction of English Sparrows (*Passer domesticus*) in this vicinity. Many of these sought the protection of out-buildings and henneries, two being actually found the next morning under a hen. Many perished from lack of food and the severe cold. In New Jersey great numbers of other species sought refuge in sheltered ravines. On Staten Island a Blue Jay (*Cyanocitta cristata*) was seen to drop dead from a tree, and near Lawrenceburg, Long Island, a Seaside Finch (*Ammodramus maritimus*) was found dead on March 12, this date being also an early record for this species.

Dr. C. Slover Allen instanced the death of many Bank Swallows (*Clivicola riparia*) after a three days' storm at Grand Menan. He also exhibited two nestlings of the Black Duck (*Anas obscura*) and fragments of one of the eggs, showing the perforated line around the larger end made by the young bird for escaping. This line is always made to the right.

October 12, 1888.—Mr. Frank M. Chapman, Vice-President, in the chair.

Mr. L. S. Foster read a list of birds noted this summer at Kiskatom, Greene Co., N. Y.

Mr. Ernest E. Thompson stated that he had heard the following birds singing throughout the night, viz.: the Golden-crowned Thrush (*Seiurus aurocapillus*), the Chipping Sparrow (*Spizella socialis*), and the Song Sparrow (*Melospiza fasciata*), as well as most of the common songsters. Mr. Thompson also remarked upon the effect of wind in repressing the songs of birds.

Mr. William Dutcher remarked that contrary to the usual published statements, he believes that Wilson's Petrel (*Oceanites oceanicus*) is the common one off our coast, as the majority of Long Island records are of this species. They were common at Little Gull Island in August, 1888.

November 30, 1888.—Mr. George B. Sennett, President, in the chair.

Mr. Frank M. Chapman read a paper entitled 'Notes on the Birds of Aiken, S. C.,' based on observations made there in November, 1887. Fifty-seven species were noted, among them a flock of fifty Crossbills, probably the third record for the State, and a single *Vireo solitarius alticola*, the second record for the State (see Auk, July, 1888, p. 324). About nine tenths of the birds seen were Sparrows and nine tenths of these *Spizella socialis*. He learned that a Mockingbird (*Mimus polyglottos*) had been observed to herald the approach of each shock of the memorable South Carolina earthquake by peculiar twitterings several moments before the rumble became audible. The English Sparrows left Aiken in a body after the earthquake.

A letter from Mr. William M. Wood of San Francisco spoke of the great number of Sea-birds that are washed ashore dead on the Pacific coast after a storm.

Mr. George B. Sennett said that Mr. Paul Babcock of New Jersey had found in his chicken coop during 'the blizzard' of last March an immense number of birds, estimated at fully twenty-five hundred, that had taken refuge there. Of these nearly one half were Bluebirds (*Sialia sialis*).

the remainder being English Sparrows. Mr. Sennett spoke also of having obtained at Erie, Pa., a few birds interesting as found in that locality. Among them a Caspian Tern (*Sterna tschegrava*); Horned Larks (*Otocoris alpestris praticola*), breeding; Shrikes (*Lanius ludovicianus*), breeding, and Grasshopper Sparrows (*Ammodramus savannarum passerinus*), breeding.

Mr. John N. Drake mentioned finding parasites resembling grains of rice among the feathers of eight specimens of Red-headed Woodpecker (*Melanerpes erythrocephalus*) taken by him in Sullivan Co., N. Y., last summer.

December 7, 1888.—Mr. George B. Sennett, President, in the chair.

Mr. Frank M. Chapman presented a paper entitled 'Notes on the Mniotiltidae of Englewood, New Jersey.' *Dendroica discolor* is the only species lacking of the thirty-two which naturally should be found there. *Dendroica tigrina* and *Geothlypis philadelphia* have been taken each once; *Dendroica vigorsii* and *Dendroica castanea* each twice. The three *Helminthophila leucobronchialis* captured have been recorded in 'The Auk.' Twelve species are summer residents. Careful observations made upon *Geothlypis formosa*, a rather uncommon species at Englewood, show it to be a bird of peculiar song habits. A male was watched for several hours and during this period he was never silent more than three quarters of a minute at a time, uttering his marked five, six, or seven rapid notes every twelve seconds with wonderful regularity. This was early in June, 1886. A week later the same bird was in his usual haunts; but at a later visit he was doubtless oppressed by family cares, and sang very little. The nest with young of another pair of these birds was found in a bush near the ground by Mr. Chapman and Mr. C. B. Riker and was exhibited. Of special note is the capture of a breeding female *Helminthophila ruficapilla* on June 16. It was not known to nest so far south. Commenting upon this paper Mr. Dutcher said that *Dendroica discolor* was a common bird on the north shore of Long Island; *Dendroica vigorsii* fairly common there and restricted to the pines.

There was some discussion about ants annoying birds, but whether they caused the birds to desert their nests and then attacked their eggs and young or only attacked them after they had been deserted, was not demonstrated.

Mr. Foster spoke of a "barrel-ful" of birds killed by striking the Statue of Liberty on Bedloe's Island, New York Harbor, the night of October 8, 1888. He saw but a small portion of them.

Dr. C. Slover Allen showed photographs of the nest of a Purple Gallinule (*Ionornis martinica*) and its surroundings taken by him at Lake Harris, Florida.

December 21, 1888.—Mr. George B. Sennett, President, in the chair.

Mr. J. A. Allen spoke upon the Tyrannidae and exhibited numerous specimens, largely from South America and the West Indies. This group is a very difficult one to study and its literature is scattered and unsatisfactory, although Sclater's 'Catalogue' of the family, recently issued, is in

most respects excellent. There are upwards of four hundred species, which Mr. Sclater divides into four sub-families, as follows; 1, Tæniopterinæ; 2, Platyrhynchinæ; 3, Elaineinæ; 4, Tyranninæ. Specimens illustrating the great variation in the appearance of the Flycatchers were shown and their peculiarities and relation to one another explained by Mr. Allen. Some of Tæniopterinæ resemble Thrushes, Wagtails, and some of the Wood Warblers, while some of the Elaineinæ show wonderful variation in the length of wing of the same species, and also in the form and size of the bill. Why Mr. Sclater has removed *Sayornis phæbe* from among its relations, *S. nigricans* and *S. sayi*, among the Tæniopterinæ, and placed it in a genus by itself among the Tyranninæ, is not clear to American students.

January 4, 1889.—Mr. George B. Sennett, President, in the chair.

Mr. Frank M. Chapman read a paper entitled 'Remarks on the Northern Limit of the Carolinian Fauna on the Atlantic Coast.' Selecting nine species representative of Carolinian birds regularly occurring in or near the valley of the Hudson, the various northern records of these species were taken as a basis for some generalizations fully supported by the facts. The species selected were: 1, *Empidonax acadicus*; 2, *Corvus ossifragus*; 3, *Stelgidopteryx serripennis*; 4, *Helmitherus vermivorus*; 5, *Helminthophila pinus*; 6, *Geothlypis formosa*; 7, *Icteria virens*; 8, *Seiurus motacilla*; 9, *Sylvania mitrata*. One of them, *Seiurus motacilla*, occurs as far up the Hudson as Albany, while most of the others have not been noted beyond Sing Sing. Most of them are found to be more or less common in Connecticut, while on Long Island they are with a few exceptions rare; thus indicating that while the Hudson Valley and southern Connecticut are distinctly tinged with the Carolinian fauna, Long Island has but little claim to such relationship. Mr. William Dutcher's evidence on this point supported Mr. Chapman's remarks, which were freely discussed by members of the society. Dr. L. B. Bishop supplied information bearing upon Carolinian species in Connecticut. He also spoke of a specimen of *Ammodramus princeps* taken in Connecticut ten miles from the sea.

Mr. Dutcher spoke of the great scarcity of birds this winter as noticed by his correspondents on Long Island.

Mr. Chapman knew of several *Tachycineta bicolor* seen and killed by a gunner near Englewood on December 31, about 1881. The day was warm. He referred to the habit this species has of feeding upon bayberries. *Dendroica coronata* also feeds upon them, and last winter, when the berries were abundant, this species was seen by him throughout the whole season independent of the weather, while this year none were to be found, and on examining the locality frequented last year by the birds he noticed that the crop of berries was small and the berries themselves bad. From this he was led to infer that the past unusually wet season may have rotted the seeds of the weeds upon which winter birds largely feed, and that this would account for their scarcity now.

Mr. L. S. Foster spoke of an unusual flight of Killdeer Plover (*Ægial-*

itis vocifera) along the New England coast after the storm of November 27. Mr. Dutcher said that his men at the east end of Long Island reported large numbers of these birds early in December.

January 18, 1889.—Mr. William Dutcher in the chair.

Mr. John Tatlock, Jr., upon being introduced, made some remarks about Prof. W. W. Cooke's recently published report upon 'Bird Migration in the Mississippi Valley.' In regard to the chapter on 'The Relation of Migration to Barometric Pressure and Temperature,' the speaker criticised Prof. Cooke's conclusions as being based upon insufficient data. Mr. Tatlock finds ground for believing that temperature alone influences bird migration, and differs further from Prof. Cooke, who thinks migration occurs simultaneously over a wide area, in deeming it largely local. In the discussion which followed, Mr. Jonathan Dwight, Jr., mentioned the necessity of the use of very full data in reaching conclusions. Mr. William Dutcher said that not very much regarding migration could be deduced from birds striking light-houses, for the reason that birds do not strike on clear nights. A single exception is that of a Greater Yellow-legs (*Totanus melanoleucus*) which struck a Long Island light-house one moonlight night. An unexplained fact is that where one bird strikes in the spring, twenty strike in the fall.

Mr. Dutcher read extracts from a letter written by Mr. Austin F. Park, Troy, N. Y., regarding *Octocoris alpestris praticola* breeding there on Green Island. Six, including three young, were taken July 21, 1888, and six others, one young just from the nest, on July 28. This is of special interest in comparison with the early breeding of the species in the western part of the State, as has been repeatedly recorded, as it doubtless indicates that the birds rear more than one brood each season. Mr. Dutcher also read extracts from the journal of the keeper of Little Gull Island light-house, Long Island, which related to the birds seen there from August 16, 1888, to the end of the year. The first Cormorants were noted September 1. One third of those seen on November 8 were "the large kind," supposed to be *Phalacrocorax carbo*.

Mr. A. H. Hawley read a paper on the birds observed by him in Santa Clara and Santa Cruz Counties, California, during the year 1888, and exhibited a large number of specimens.

February 1, 1889.—Mr. George B. Sennett, President, in the chair.

Mr. Dutcher read a paper by Mr. Newbold T. Lawrence, entitled 'Long Island Bird Notes,' which will be published later in 'The Auk'; he also exhibited a singular looking mollusk (*Æolus papillosa*), in alcohol, from Long Island.

Dr. George Bird Grinnell presented a paper upon the Rocky Mountain Goat (*Mazama montana*), which will be published in 'Forest and Stream.' The limits of the range of this animal have never been fully defined by any one writer. It is a mammal belonging to the Arctic fauna and only found among the high and rugged mountains of the Rockies and Coast Range, where the snow lies all the year. The center of its abundance seems to be in Western Montana, Idaho and Washington Territories, and

British Columbia, and it has been found from about latitude 44° to about latitude 65°; its southernmost records being on the highest peaks of the Sierra Nevada, near Mt. Whitney ('Forest and Stream,' Feb. 26, 1885). This Goat is in no immediate danger of extermination, as it inhabits the most inaccessible localities and has few natural enemies.

Papers were read from the following persons: Mr. E. S. Gilbert, on 'Crow Roosts and Crows'; Dr. F. W. Langdon, 'On the Occurrence in large numbers of Sixteen Species of Birds in Ohio,' as follows: *Fulica americana*, *Ectopistes migratorius*, *Asio accipitrinus*, *Conurus carolinensis*, *Chordeiles virginianus*, *Corvus americanus*, *Molothrus ater*, *Quiscalus quiscula æneus*, *Loxia curvirostra minor*, *Loxia leucoptera*, *Habia ludoviciana*, *Progne subis*, *Clivicola riparia*, *Stelgidopteryx serripennis*, *Ampelis cedrorum*, and *Helminthophila peregrina*; Mr. George N. Lawrence, 'An Account of the Former Abundance of some species of Birds on New York Island at the time of their Migration to the South'; Mr. C. J. Pennock, 'Thousands of Turkey Buzzards, and a Flight of Hawks'; Mr. John H. Sage, 'A Flight of Hawks'; and Mr. E. E. Thompson, on 'Bird Hosts in Manitoba.' Mr. John N. Drake also gave a verbal account of Grackles roosting in great numbers in a Maine swamp. Mr. Lawrence's paper having a peculiar personal and local interest is here given in full.

An Account of the Former Abundance of some species of Birds on New York Island, at the time of their Migration to the South. BY GEORGE N. LAWRENCE.

At our country place (Forest Hill), eight miles from the City Hall, situated on the high ground immediately north of the valley of Manhattanville and fronting on the Hudson River, the opportunity to observe the movements of migratory birds was an excellent one, as they generally followed the course of the river in their line of flight. Here our family lived, during the summer, until about 1850, when the place was sold.

From my earliest recollection I had a fondness for birds, and before I could use a gun, watched the great numbers passing with much interest. I was allowed to have a gun about the year 1820, and from that time until leaving our old homestead, I paid more strict attention to their movements and the times of their appearance.

The first birds flying south were the Red-winged Blackbirds (*Agelaius phoeniceus*); from the middle of July, for some weeks, there would be a flight of this species every afternoon, coming in flocks, of from twenty-five to fifty or more individuals.

During most of August and September, in the afternoon of each day there would be a continuous flight of the White-bellied Swallow (*Tachycineta bicolor*), accompanied by a few Barn Swallows (*Chelidon erythrogaster*); the number that passed was very great.

About the first of September, when there was a strong northwest wind, Passenger Pigeons (*Ectopistes migratorius*) were sure to appear in great

numbers, flying more abundantly in the morning, though there were occasional flocks all day. From our place north to Fort Washington Point, three miles distant, the view was unobstructed, and for the entire distance it was almost an unbroken forest. We could see the flocks make their appearance over the Point, consisting of from twenty-five to over a hundred Pigeons, and come sweeping down over the tree tops seemingly at a speed of about 75 miles an hour, and consequently they soon reached the position where we were awaiting them. The flocks followed each other in quick succession, and as they dashed by before a strong northwester—sometimes quite close to the ground—they did not offer an easy mark for even an expert gunner. I never succeeded in killing more than four with one shot, from a passing flock.

On the south side of Manhattanville Valley the ground is elevated, much the same as it is on the north side. Here is one of the old country seats on the Hudson River, known as 'Claremont,' and this place was fixed upon as the most eligible sight for General Grant's Tomb. The original fine dwelling house is still in good condition. During one of these great flights of Pigeons, the house was occupied by some gentleman, whose name I cannot recall, but I remember that from the top of the house, in one morning, a hundred or more were shot by him. These flights continued as long as I lived at Manhattanville, and Pigeons were quite abundant, I was informed, for some years after, but at the present time a single one would be a rarity. Even into October there would be a flight when the wind was favorable, but in the earlier flights they were the most abundant.

In September Kingbirds (*Tyrannus tyrannus*) flew south in considerable numbers. They were much prized as game, by our foreign citizens with shooting proclivities.

About the first of October, on the occurrence of a few cold days, there would be a flight of Golden-winged Woodpeckers (*Colaptes auratus*) and some Red-headed Woodpeckers (*Melanerpes erythrocephalus*). They did not come in flocks, but singly in large numbers.

At the same time Blue Jays (*Cyanocitta cristata*) passed south in large flocks.

On favorable days in October there would be large flights of Crows (*Corvus americanus*) winging their way south to a more congenial climate.

In October flocks of Cedar birds (*Ampelis cedrorum*) migrated south very regularly. During the same month the plaintive melody of the note of the Bluebird (*Sialia sialis*) would be heard overhead from passing flocks. This favorite species was much sought after by young gunners: I have seen boys with long strings of them, carried in that way for the want of a game bag.

By the middle of October, Robins (*Merula migratoria*) were abundant, sometimes flying in flocks, but at other times they came in such numbers that they could be seen almost everywhere. They continued to be numerous for about two weeks, when the majority went south, though

some would remain even into the winter. The flight was usually from the north, but on one occasion, the first great flight of that year, was from the south at the point where I was, and I never saw them in greater numbers. This was a movement that much surprised me.

When I was a schoolboy a favorite skating place was Stuyvesant's Creek, a considerable body of water, which had its head quite close to the Third Avenue, about 20th Street, and it emptied into East River—I think about 12th Street. On the north side of it, there were high woods, where I have seen Robins pursued by gunners, when the ground was covered with snow and the creek frozen.

Speaking of skating, reminds me of an experience I had when a boy; it was one that probably but few persons have had who are now living. I skated from the 'Collect,'* (quite a large pond so called, which existed near where the 'Toombs' now stands in Centre Street) down the Canal that ran through the middle of Canal Street and was the outlet of the Collect. I passed under the wooden bridge, that crossed the canal at Broadway, and on to Lispenard's Meadows, some distance west of Broadway. These meadows occupied a large area, and extended to the Hudson River.

At the time the Robins were migrating, there would be frequently flocks of Meadow Larks (*Sturnella magna*) going south. I recollect in my younger days, that about three miles from the City Hall, on the east side of the Bloomingdale Road, were extensive pasture fields—about where 40th Street now is; in these the Larks accumulated in large numbers in October, and of course were much hunted by city gunners.

March 1, 1889.—Annual Meeting. Mr. George B. Sennett, President, in the chair.

The following officers were elected for the ensuing year. President, Mr. J. A. Allen; Vice-President, Mr. Frank M. Chapman; Secre-

[* Concerning this pond, DeWitt Clinton says, in his paper read before the N. Y. Lyceum of Natural History, August 9, 1824, 'On the *Hirundo fulva* of Vieillot': "Reputable men, laboring under optical delusion, have declared that they have witnessed the descent of the swallow into the Hudson, and the pond on Manhattan Island called the Collect."

"North of this lay the Fresh Water Pond, with its neighboring district of the Collect or Katch-Hook. This name, which finally came to be applied to the pond itself, was originally given by the Dutch settlers to a point of land on the shores of the pond of about forty-eight acres in extent, the site of an old Indian village. The Fresh Water Pond was one of those traditional ponds which are found in every village, reputed to have no bottom—a reputation which it failed to sustain against the researches of modern times. The pond was indeed, very deep; deep enough, in fact, to have floated the largest ships in the navy. Its waters were filled with roach and sunfish, and to preserve these, the city authorities passed an ordinance in 1734, forbidding any person to fish in it with nets, or in any other way than angling. But the beautiful pond has passed away, and the spot where its sparkling waters once played is now filled by the 'Halls of Justice' with its gloomy prison cells."—MARY L. BOOTH, Hist. City of New York, 1st. ed., 1859, pp. 322, 323.—L. S. F.]

tary, Mr. Jonathan Dwight, Jr.; Treasurer, Dr. C. Slover Allen. Resolutions were adopted relative to the death of Mr. S. Lowell Elliott, a Resident Member. Mr. Ernest E. Thompson made some remarks upon the 'Zoögraphical Areas of the Province of Ontario, Canada,' in substance as follows: A line drawn from the southern end of Georgian Bay to the eastern end of Lake Ontario seems to divide the Canadian from the Alleghanian fauna, and this same line is the dividing line between the Laurentian and Silurian geological formations. North of it is a region of rocks and fresh water lakes, where are found such species of birds as the Spruce Partridge (*Dendragapus canadensis*), Hudsonian Chickadee (*Parus hudsonicus*), and Three-toed Woodpeckers (*Picoides arcticus* and *P. americanus*); while south of it is found an alluvial soil and a fine farming country, where such species as the Black Squirrel (*Sciurus carolinensis leucotis*), Fox Squirrel (*S. niger ludovicianus*), Blue-gray Gnatcatcher (*Polioptila cærulea*), Wood Thrush (*Turdus mustelinus*), and Red-bellied Woodpecker (*Melanerpes carolinus*) are found. Along the shores of Lake Erie grow liriiodendron, walnut, chestnut and peach. North of this is a region of tamarack swamp, although in elevation 250 feet higher. At Ottawa there is an area of depression, characterized by many forms of life usually confined to more southern latitudes. Such species as *Polioptila cærulea*, *Turdus mustelinus*, *Harporhynchus rufus*, *Ammodramus passerinus*, and *Ammodramus caudacutus* are among those recorded from this region. Near Lake Nipissing is another area of depression where some oak and beach are found. A curious fact is that during the spring migration the Plovers and Shore-birds approach Toronto from the east and then turn abruptly northward, while the Warblers come from the southwest. Fifty years ago the Skunk (*Mephitis mephitis*) was not found at Toronto, where it is now established. A strange record is that of a Franklin's Spermophile (*Spermophilus franklini*) killed near Gravenhurst, about 120 miles north of Toronto.

Mr. George B. Sennett exhibited, from his collection from Tamaulipas, Mexico, many species of birds given in Mr. Ridgway's 'Manual' as found in the region contiguous to the United States, and liable to occur within our limits.—JONATHAN DWIGHT, JR., *Recording Secretary*.

A LIST OF MEMBERS OF THE LINNAEAN SOCIETY

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THOS. W. WILSON.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

FOR THE YEAR ENDING MARCH 7, 1890.

OFFICERS.

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| <i>President,</i> | J. A. ALLEN. |
| <i>Vice-President,</i> | FRANK M. CHAPMAN. |
| <i>Secretary,</i> | JONATHAN DWIGHT, JR. |
| <i>Treasurer,</i> | L. S. FOSTER. |

The Society meets on the first and third Friday evenings of each month at the rooms of the American Geographical Society, No. 11 West 29th Street, New York City.

A B S T R A C T
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
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FOR THE YEAR ENDING MARCH 7, 1890.

A large proportion of the papers read before the Society have been published in full in 'The Auk,' 'Forest and Stream', and the 'Bulletin of the American Museum of Natural History'. Consequently only the titles, with reference to the place of publication, are given in the abstract which now follows, showing in outline the work of the Society during the year ending with the meeting of March 7, 1890.

March 15, 1889.—The President in the chair. Twelve persons present.

Mr. L. S. Foster presented a paper 'On the Breeding Habits of the Swifts of the World.' Many authorities were cited, and the twenty known species were treated at length.

Mr. Geo. B. Sennett stated that a nest with four eggs of the Great Horned Owl (*Bubo virginianus*) had been found by one of his collectors at Corpus Christi, Texas, Feb. 22, 1889. Its site was unusual,—a hole, in the low bluff of a river bank, such as the Barn Owl (*Strix pratincola*) regularly selects in Texas,—and, stranger still, it contained three live rattlesnakes. He had also received a set of eggs of the Bald Eagle (*Haliaeetus leucocephalus*), taken Nov. 6, 1888,—“a case of beginning to lay the year before.”

Dr. Robert T. Morris mentioned that the chrysalids of the Cecropia moth (also of the Prometheus moth) were unusually abundant this year in the vicinity of New York City, nearly every deciduous tree being covered with them. Those on Long Island that he had examined had been destroyed by the ichneumon, which

is known to be a check upon the increase of the Cecropia, and he thought it would probably attack the chrysalids in New Jersey next year. Other members had noted their abundance.

Mr. Jenness Richardson reported the capture at Sing Sing, Jan. 19, 1889, of a Glaucus Gull (*Larus glaucus*), the second record of this species for New York.

April 19, 1889.—The Vice-President in the chair. Nine persons present.

A newspaper clipping was read by Mr. Jonathan Dwight, Jr., wherein Lieut. Gibbons of the Navy states it as his opinion "that fish-eating birds, cape pigeons, petrels, etc., eject oil from the mouth for the purpose of stilling the waves about them when floating on the water." A later admission that the oil may be deposited involuntarily, or at least without such purpose, seemed more plausible.

Mr. Frank M. Chapman outlined his recent trip to Brevard Co., Florida, describing the nature of the country, and the interesting specimens obtained there. Among them were some Round-tailed Muskrats (*Neofiber alleni*), hitherto known from four specimens only [see Bull. Am. Mus. Nat. Hist., June, 1889, Vol. II, No. 3]; also two Bachman's Warblers (*Helminthophila bachmani*) [see Auk, Vol. VI, 1889, p. 278], not taken on the Atlantic coast since the types were obtained in South Carolina, in 1840; and fifteen Paroquets (*Conurus carolinensis*), the rarity of which well-nigh exterminated bird does not need comment. Mr. Chapman had good opportunity of observing several small flocks in the wild region they inhabited on the Sebastian River. In this region Florida Ducks (*Anas fulvigula*), and typical Florida Red-shouldered Hawks (*Buteo lineatus alleni*) were resident, and a Great White Heron (*Ardea occidentalis*) was seen.

Mr. Jonathan Dwight, Jr., illustrated with specimens the changes of plumage through which several species pass before attaining adult dress, e. g., Chickadee (*Parus atricapillus*), Red-breasted Nuthatch (*Sitta canadensis*), Golden-crowned Kinglet (*Regulus satrapa*), and Black-throated Green Warbler (*Dendroica virens*). The young of the first two species are brighter and deeper colored in the fall and winter than are the adults, a fact first noticed by Mr. Wm. Brewster [see Bull. Nutt. Ornith. Club, Vol. III, 1878, pp. 17-21].

Mr. John N. Drake exhibited, in alcohol, a worm he had found embedded in the liver of a Wilson's Thrush (*Turdus fuscescens*).

May 3, 1889.—The Vice-President in the chair. Seven persons present.

Mr. L. S. Foster read notes on birds seen by him April 30, 1889, near Van Cortlandt Lake, N. Y.

Mr. Ernest E. Thompson stated that in England the Pheasant (*Phasianus colchicus*) had to be artificially hatched and reared to prevent the species dying out. According to Dr. C. S. Allen this bird was successfully introduced on Jekyll Island, off the Georgia coast, and raised its own broods. The Wild Turkey (*Meleagris gallopavo*) still breeds on this island.

May 17, 1889.—The President in the chair. Ten persons present.

Mr. Arthur H. Howell read a list, with notes, of the birds he had found breeding on Long Island, N. Y.

Mr. Frank M. Chapman stated that he had seen eggs of the Song Sparrow (*Melospiza fasciata*) as late as Aug. 3, and eggs of the Cedar Bird (*Ampelis cedrorum*) on Sept. 13, in northern New Jersey. Mr. Chapman also related his experience, the night of May 15, 1889, from 8.10 to 11.05 P. M., watching

migrating birds through a telescope at Columbia College, N. Y. The East River is probably a great highway of migration like the Hudson, upon which similar observations have been made and already recorded [see Auk, Vol. V, 1888, p. 32]. At times as many as three birds were in the field of view, and they straggled along much as flocks of swallows do.

Some spring arrivals were reported at this meeting, among them a large flight of Yellow-bellied Woodpeckers (*Sphyrapicus varius*), after the warm days of April 11-12.

Mr. Jenness Richardson gave an account of a recent visit to Amagansett and Gardiner's Island, Long Island. At the latter place, three nests of the Black Duck (*Anas obscura*) were found early in May, one with young. The Carolina Wren (*Thryothorus ludovicianus*) was met with twice.

The absence of the Myrtle Warbler (*Dendroica coronata*) from the vicinity of New York City, the past winter was spoken of by several members.

October 4, 1889.—The Vice-President in the chair. Seven persons present.

Mr. L. S. Foster presented some notes on birds observed by him at Kiskatom, N. Y., in August and September, 1889.

Mr. Wm. Dutcher reported the recent capture of an albino White-bellied Swallow (*Tachycineta bicolor*) at Good Ground, Long Island; and also spoke of a migration of hawks on Sept. 21-22. Those along the south shore of Long Island were largely Sparrow and Pigeon Hawks (*Falco sparverius et columbarius*) with numbers of Fish Hawks (*Pandion haliaëtus carolinensis*) and Marsh Hawks (*Circus hudsonius*), while those along the north shore were mostly Sharp-shinned and Cooper's Hawks (*Accipiter velox et cooperi*).

Mr. F. M. Chapman made some remarks upon the meadow mice of Little Gull Island, L. I., visited last summer by Mr. Dutcher and himself. They do not differ materially from the common *Arvicola riparius* and apparently show no approach to the pale form inhabiting Muskeget Island. The immense number of toads on this island, where there are no snakes to destroy them, was striking.

The migration of the brown butterfly (*Danaïs archippus*), as observed in the vicinity of New York and on Long Island, was discussed at length. During some days in the autumn the air is often filled with them passing southward.

October 18, 1889.—The President in the chair. Nine persons present.

Mr. J. A. Allen presented extended remarks, illustrated by specimens, upon a collection of mammals recently made by Dr. A. Buller in Zacatecas, Mexico. [This paper has been published in Bull. Am. Mus. Nat. Hist., Vol. II, No. 3, 1889.] Mr. Allen also gave a brief summary of recent progress in North American mammalogy, referring especially to the impetus recently given through the excellent work of Dr. C. Hart Merriam, whose collection of the smaller North American mammals is at present unrivalled in extent and in quality of the material.

November 1, 1889.—The President in the chair. Ten persons present.

Mr. Frank M. Chapman read the following paper.

Notes on the Carolina Paroquet (Conurus carolinensis) in Florida. BY FRANK M. CHAPMAN.

Fifteen years ago, Paroquets were more or less generally distributed throughout Florida and in many places were extremely abundant, and even at a more recent date they were not uncommon in numerous localities, but to-day they have entirely disappeared from the more settled portions of the state, and we may look for them only beyond the bounds of civilization, indeed in regions which are practically uninhabitable. In just what numbers they still exist it is impossible for us to say.

Florida with its 58,000 square miles almost equals in area the whole of New England, and contains immense tracts of land still *terra incognita* to the naturalist so far as actual exploration goes, but the reports which we have received from these regions through 'plumers' (men who shoot birds for the milliners) and hunters who have visited them lead us to suppose that Paroquets may still be found in considerable numbers. I refer to the immense hummocks and swamps bordering the Gulf in western Florida, but more especially to that country known in part as 'St. Johns Prairie', a vast tract of totally uninhabited land lying south and west of the headwaters of the St. Johns, north of the headwaters of the St. Lucie, and between the Indian and Kissimmee Rivers, a country composed largely of open saw-grass prairies, more or less under water, dotted with occasional clumps of cypresses, pines or cabbage palms. Of the first named region, I have no personal knowledge, but from it we receive information which is undoubtedly accurate concerning the presence of *Conurus* in greater or less numbers (cf. Brewster, Auk, VI, Oct., 1889, p. 336); of the latter place, I have been told, a visiting hunter found Paroquets north of the north fork of the Sebastian River in large numbers no later than last Spring (1888), a report in which I think we may place some confidence, and my friend, Mr. George M. Field, found a small flock in the winter of 1887-88 in the vicinity of the headwaters of the St. Lucie.

During two winters, 1886-87 and 1887-88, I had endeavored to obtain some definite knowledge of the presence of Paroquets at any given locality, and although making diligent inquiry while travelling or collecting, not once did I find a person who could give me the positive information I desired. At Fort Myers, on the Caloosahatchie, I interviewed several plume hunters familiar with the Okeechobee region, but beyond two or three small flocks said to have been seen in the cypresses at the northeastern part of the lake they had no knowledge of them; however, from a dealer at Fort Myers, Mr. C. B. Cory obtained two skins taken the preceding year (1887) on the Kissimmee, by a hunter who, the dealer informed us, had nearly a hundred in his possession, all of which, except the two procured, in too poor condition to be marketable. This is simply additional testimony in support of the report I have since received from the St. Johns region, and returning to Florida, the following year (1889), I determined to visit the east coast and continue the hunt so far as circumstances would permit.

Reaching the east peninsula opposite Micco, February 14, I heard here vague rumors of Paroquets being found near the headwaters of the Sebastian River, a small stream flowing from the interior into the Indian River at a point six miles from our home. In less than a month these rumors assumed definite form in the shape of three specimens shown me from the region in question, and securing a boat I at once started with their captor for the scene of his success.

The Sebastian is a beautiful river ; no words of mine can adequately describe it. Half a mile wide at its mouth, it narrows rapidly, and three miles above appears as a mere stream which at our camp, eight miles up, was not more than fifty feet in width and about fifteen in depth. Its course is exceedingly irregular and winding ; the banks as we found them are high and for some distance from the water densely grown with palms and cypresses which, arching, meet overhead, forming most enchanting vistas, and in many places there was a wild profusion of blooming convolvulus and moon-flower. Immediately back of this semi-tropical growth appeared the pines, which extended as far as the eye could reach, with occasional openings termed 'prairies', varying in extent from two or three to as many hundred acres, where the trees were replaced by a species of tall grass growing scantily in the shallow water which flooded these meadows. Such localities were frequented by occasional Sand-hill Cranes, and perhaps here also herons once abounded ; now the survivors have retreated to the more inaccessible prairies of the interior, and we heard rumors of rookeries to be attacked by parties organized expressly for the purpose. About these 'prairies' and at the borders of small streams or low ground grew in abundance a species of thistle (*Cirsium Lecontei*, T. & G.) the seeds of which, so far as I could learn, constituted at this season the entire food of *Conurus*. Not a patch of thistles did we find which had not been visited by them, the headless stalks showing clearly where the thistles had been neatly severed by the sharp chisel-like bill, while the ground beneath favorite trees would be strewn with the scattered down.

From a favorite and productive patch, late on the night of our arrival, we started a flock of seven birds. Evidently their meal was finished and they were ready to retire, for they darted like startled doves through the pines, twisting and turning in every direction, and flying with such rapidity they were soon lost to view, the ring of their sharp rolling call alone furnishing proof it was not all a vision. Two days passed before I again met *Conurus*, and this time to better advantage. It was a wet and drizzling morning when we found a flock of six birds feeding on thistles at the edge of a 'prairie'. Perched on the leafless branches of the tree before us, their brilliant green plumage showed to the best advantage, as we approached through the pines without difficulty. Several were skillfully dissecting the thistles they held in their feet, biting out the milky seed while the released fluffy down floated away beneath them. There was a sound of suppressed conversation ; half articulate calls. We were only partially concealed behind a neighboring tree, still they showed no great alarm at our presence ; curiosity was apparently the dominant feeling. One of the three birds which fell at our fire was but slightly wounded, a single shot passing through the elbow, and his loud outcries soon recalled his companions,—a habit which has cost thousands of them their lives, and in part at least accounts for the rapidity of their extermination,—and one alone of this flock escaped.

There was an evident regularity in the habits of the birds we afterwards observed,—in all about fifty, in flocks of from six to twenty. At an early hour they left their roost in the hummock bordering the river and passed out into the pines to feed, always, so far as I observed, selecting thistle patches, and eating the seeds only when in the milky stage. At about ten o'clock they returned to the hummock and apparently to some favorite tree, here to pass the rest of the morning

and early afternoon, when they again started out to feed, returning to the roost just before sunset. A flock of these birds feeding among the thistles is a most beautiful and animated sight; one is almost persuaded not to disturb them. There is constant movement as they fly from plant to plant, or when securing thistles they fly with them in their bills to a neighboring tree, there to dissect them at their leisure. The loud rolling call was apparently uttered only when on the wing, but when at rest, or feeding, there was a loud conversational murmur of half articulate, querulous notes and calls.

Of their roosting habits I can say little or nothing. Late one morning (March 15) we found a flock of eight birds resting on a tall, dead cypress near the centre of the hummock on the river's bank. On a previous expedition my guide had observed them in this same tree, which was evidently a favorite midday haunt, and it is not impossible they may have roosted in the hole we discovered up above. These birds took flight as we approached, but twice returned while we waited below, leaving five of their number with us. We secured in all, during our stay of one week, fifteen specimens, only one of which was immature and none of which showed signs of breeding.

'Con,' the individual captured alive on the first day, proved an interesting but perfectly intractable pet. From the moment of his capture he exhibited not the slightest fear, and sat on his perch as sedately and with as much confidence in his own undoubted powers of self-defense as though he had been born in captivity. Thistles, he eagerly accepted from our hands, refusing unripe or imperfect ones and calling for more till his hunger was satisfied. In May he was brought north, and his food now consisted of hard kernels of corn, the customary cracker and various other kinds of parrot food, except an occasional bit of apple, having apparently no charms for him. He resisted every approach at intimacy and passed the greater part of the day, and frequently also the night, hanging by bill and claws from the top of his cage. In September he commenced to moult, and by November had acquired an entirely new plumage. This fact in connection with the undeveloped condition of the sexual organs in the individuals captured, would lead us to suppose they nest late in the summer. Whether constant association with mankind would in time have improved his disposition is a question which will never be settled, for in the following December poor 'Con' met his death in the American Museum of Natural History by a midnight attack from rats.

Mr. J. A. Allen read extracts from, and commented upon a Report by Dr. R. Blanchard, entitled '*De la Nomenclature des Êtres Organisés*' presented at the *Congrès International de Zoologie*, Paris, August, 1889. [A review of this 'Report' may be found in *Auk*, Vol. VII, 1890, p. 73.]

November 15, 1889.—The Vice-President in the chair. Fifteen persons present, including Mr. William Brewster of Cambridge, Mass.

Mr. F. M. Chapman read a paper by Mrs. F. E. B. Latham of Micco, Brevard Co., Florida, 'On the nesting habits of the Loggerhead Turtle'. It was accompanied by a large series of embryos in different stages and occasioned considerable discussion. [Printed in '*Forest and Stream*,' Jan. 9, 1890, p. 496.]

Dr. Edgar A. Mearns presented an extended paper giving in much detail the life history of the squirrels of Arizona. In the discussion following, Mr. Sissènère

made a few remarks upon the food habits of the squirrels of northern Europe; Mr. Thompson stated that he had seen the Red Squirrel (*Sciurus hudsonius*) eating fungus supposed to be poisonous; Mr. Brewster had seen this animal eating mushrooms; and Dr. Morris and Mr. Higgins had seen the Gray Squirrel (*Sciurus carolinensis*) do the same. Mr. Brewster also related how he had known both the Red Squirrel and the Chipmunk (*Tamias striatus*) to occasionally pounce upon and carry off wounded birds.

December 6, 1889.—The Vice-President in the chair. Twenty-one persons present.

Mr. Wm. Dutcher exhibited a fine specimen of the Red-billed Hill Tit (*Liothrix lutea*) of India, recently shot on Long Island, N. Y. Its appearance did not indicate a cage bird, and it might have been added to the list of recorded extralimital species if Mr. Jenness Richardson had not recollected that a lot of forty of this species had been imported last spring by a New York bird-fancier. Most likely this bird escaped, and has been enjoying its freedom all summer, which would account for its fresh appearance. This is a good illustration of how other strange captures might be accounted for.

Mr. E. T. Adney presented a paper on 'Bird Names of the Milicetes.' As he had spent eighteen months in contact with this Indian tribe, he was well qualified to do justice to the pronunciation and derivation of names applied to familiar birds. The Milicetes live in New Brunswick, Canada, and have names for about eighty species of birds, distinguishing, as might be expected, only those that are prominent by habit, by color, or more particularly perhaps by song. Large birds, especially water-fowl, are known by the general name of 'seeps,' and small ones are called 'seepsis.' Some species have several names applied to them, and when in imitation of their notes, the Indian representation is excellent. In some cases the original name has been replaced by one imitating the English or French word in use by the white settlers of the region. No work has ever been published on the dialect spoken by the Milicetes, so that when Mr. Adney publishes his paper in full, as it is his purpose to do, it will be of interest not only to the ornithologist, but to the philologist as well.

Mr. Alfred Marshall read a paper on the nests and eggs secured by him on Long Island, N. Y., during several past seasons. The list includes forty-eight species with full data of each set taken.

Mr. Oscar Sissenère read an interesting paper on the Lemming (*Myodes lemmus*) of Norway.

It is much to be regretted that the manuscript of this paper has been accidentally destroyed, as it was the purpose of the Society to publish it in full. It was descriptive of a collecting trip made in 1879 by the writer and four others to one of the snow peaks of the central plateau region of Norway. The party met with a number of species of birds, a herd of reindeer, and a colony of lemmings, and the account of the excursion was both instructive and entertaining.

Mr. Wm. Dutcher read an extended paper entitled 'A Winter Trip to Montauk.' [Published in abstract in 'Forest and Stream,' April 3, 1890, p. 206.]

December 20, 1889.—The Vice-President in the chair. Eight persons present.

Mr. Jonathan Dwight, Jr., made extended remarks upon fifty-five species of birds observed by him at Digby, Nova Scotia, during the latter part of August, 1886.

Mr. Chapman stated that the Myrtle Warbler (*Dendroica coronata*) was now abundant at Englewood, N. J., and this seems to be the case each winter when the crop of bay-berries has been a good one.

Mr. Arthur H. Howell read a paper on birds observed at Lake Grove, Long Island, N. Y., during July, August and September, 1889. Sixty-two species were enumerated with full notes upon each.

Mr. L. S. Foster read a newspaper clipping showing the number of animals on which bounties had been paid in Suffolk Co., Long Island, during eleven months of 1889. The figures are, woodchucks 3,427, opossums 4,673, raccoons 123, minks 165, and weasels 354.

In discussing the incubation of eggs, Mr. Thompson stated that the covering up with vegetable matter of the eggs of grebes did not, as is popularly supposed, produce heat.

January 3, 1890.—The President in the chair. Eleven persons present.

Mr. Jonathan Dwight, Jr., commented upon a list of 119 species of birds observed near the Strait of Mackinaw, Michigan, during a trip made in May, 1888, with Mr. Wm. Brewster. The first portion of this paper was read at the last meeting of the American Ornithologists' Union, the annotated part of the list having been then omitted.

Mr. L. S. Foster presented some facts about the Snowy Owl (*Nyctea nyctea*), as well as other owls, hawks, etc., derived from letters recently received. One from Mr. Thomas McIlwraith of Hamilton, Canada, under date of December 30, 1889, is of interest, taken in connection with the numerous later records of the Evening Grosbeak (*Coccothraustes vespertina*), in New England the past winter, and is here quoted in part.

'On the 19th of the present month (December 1889), a friend sent me two female Evening Grosbeaks which he had shot on the north shore of Hamilton Bay. The banks there are steep and rise fifty feet above the water; they are much cut up with gullies, and grown over with sumachs, wild vines and stunted red cedars. I visited the place in the afternoon but failed to see birds of any kind save ducks. On the 23rd, a junior member of my family came home for his holidays and readily took up the trail of the grosbeaks. Taking a canoe he started at the west end of the bay and carefully examined the north shore till he finally came on the flock, about twenty in number, in one of the sheltered gullies, feeding on the berries of the red cedar, the crop of which this season is unusually large. Males and females were there in about equal numbers, the former being very handsome birds, richer and darker in plumage than some summer specimens which I have seen. Whether there has been a general migration of this species to this part of Ontario remains to be seen, but most likely, I think, this is an isolated flock carried hither by the recent gales from the northwest, or led on by a daring leader ambitious of exploring new territory. I saw them last on the 25th feeding as usual on the cedar berries, ejecting the pulpy part and using only the little white seeds.'

In another part of his letter Mr. McIlwraith suggests the theory that when a fall is open and mild, the birds stay later than usual and eat up the food that the winter birds depend upon, and in consequence the latter are obliged to go farther south than is their custom.

A letter from Dr. F. W. Langdon of Cincinnati, Ohio, told of the remarkable find of three Cat Bird's (*Galeoscoptes carolinensis*) eggs in the stomach of a Swallow-tailed Kite (*Elanoides forficatus*), two of them unbroken.

Mr. J. A. Allen read from a letter by Mr. Geo. K. Cherrie of the early appearance of North American migrants at San José, Costa Rica; also from a paper giving an account of the nesting in Costa Rica of several little known species, among them *Myiozetetes texensis* and *Elanea pagana*. A photograph of a nest of *Todirostrum cinereum* was exhibited. This species suspends its nest upon some dead branch a few feet above a stream, constructing it so that it looks like a bit of drift caught when the water was high. [This paper will appear in full in *The Auk*.]

Mr. Jonathan Dwight, Jr., exhibited a typical series of the races of the Horned Larks of North America (*Otocoris*), selected from about 1,200 skins sent to the last meeting of the A. O. U., and pointed out their differences, showing at the same time, by means of a map their geographical distribution. [For later studies on the group, see *Auk*, Vol. VII, 1890, pp. 138-158.]

January 17, 1890.—Dr. Edgar A. Mearns in the chair. Nine persons present, including Prof. John M. Stedman, of Cornell University, Ithaca, N. Y.

Mr. L. S. Foster read a translation of a communication from Señor Don F. Gonzales Rubio of La Paz, Lower California. It was dated April 9, 1885, and though the work of an untrained observer, it contained much information concerning the birds of La Paz and vicinity.

Mr. Wm. Dutcher reported the capture of a Varied Thrush (*Hesperocichla nevada*) in a rabbit-trap, near Port Jefferson, Long Island, N. Y., on Dec. 20, 1889.

Mr. Dutcher also read a report, prepared at his request by Mr. M. B. Griffing of Shelter Island, on the breeding of the Fish Hawk (*Pandion haliaëtus carolinensis*) at the eastern end of Long Island. This report goes to Capt. Chas. E. Bendire to be used in his forthcoming work on North American oölogy. Mr. Griffing stated that this bird arrived about March 29, and left for the south about October 25. Dr. Mearns said he had found the species breeding on pinnacles of rock in Yellowstone Park.

Mr. L. S. Foster spoke of the capture by Mr. W. W. Worthington, of an Ipswich Sparrow (*Ammodramus princeps*), January 8, 1890, on the coast of Georgia [recorded in *Auk*, Vol. VII, 1890, p. 211].

Prof. John M. Stedman, department of entomology, Cornell University, made a few remarks upon the methods of study followed there, and gave some account of the wire worm, and the life history of the vinegar eel.

February 7, 1890.—The President in the chair. Eleven persons present.

A letter from Dr. A. Girtanner of Switzerland to Mr. Foster mentioned the occurrence there this winter of a Hawk Owl (*Surnia ulula*),—a very rare visitor.

Dr. Edgar A. Mearns read field notes from his journal kept in November, 1884, during a trip of 600 miles in central Arizona, containing much of interest concerning the birds and mammals of the region.

A letter from Mr. E. E. Thompson reported Evening Grosbeaks (*Coccothraustes vespertina*) at Toronto.

Mr. J. A. Allen had recently examined the collection of the late John G. Bell. It contained some 6000 bird skins and among them some taken on Audubon's expedition up the Missouri River, in 1843, which Mr. Bell accompanied.

Mr. Geo. B. Sennett stated that a flock of King Eiders (*Somateria spectabilis*) had been seen at Erie, Pa., in January. This species has been recorded there in the autumn, but only once before in winter, the lake usually being frozen over at this season. He also spoke of how difficult it was to record birds taken on the plains along the Rio Grande, Texas, for the reason that the river every now and then shifts its course ten miles or so, and what is Mexico one week may be United States the next.

February 21, 1890.—The President in the chair. Seven persons present.

Mr. Geo. B. Sennett read extracts from his address to the Pennsylvania State Board of Agriculture upon the subject of bird protection, read before the Board a year ago and now in press as a part of the Annual Report of the Board for 1889. Mr. Sennett also recorded the capture of a Derby Fly-catcher (*Pitangus derbianus*), at Devil's Lake, Texas, in January, 1888. Its toes had been frozen off during a cold spell, but had healed before it was secured.

Mr. J. A. Allen showed, with a series of specimens, the changes of pelage through which the Red Squirrel (*Sciurus hudsonius*) passes. [The paper will soon be published in Vol. III, Bull. Am. Mus. Nat. Hist.]

Mr. Sennett read a newspaper clipping telling of a novel way by which English Sparrows were caught in large numbers in the coal regions of Pennsylvania and afterwards sold for trap-shooting. Flocks of them roost among the rafters of the engine houses. Hot coals are taken from the furnaces, and when water is poured upon them, sulphurous fumes arise that stupefy the sparrows so that they fall to the ground, but revive when taken into the open air.

March 7, 1890.—Annual Meeting. The President in the chair. Eleven persons present.

The following officers were elected for the ensuing year. President, Mr. J. A. Allen; Vice-President, Mr. Frank M. Chapman; Secretary, Mr. Jonathan Dwight, Jr.; Treasurer, Mr. L. S. Foster.

Mr. J. A. Allen made extended remarks on the Chipmunks (*Tamias*) of North America, illustrated by specimens selected from a series of six or seven hundred now in his hands. [The paper will appear in Vol. III, Bull. Am. Mus. Nat. Hist.]

Mr. William Dutcher stated that a Clapper Rail (*Rallus longirostris crepitans*) had been heard on Long Island, March 1, by Mr. N. T. Lawrence. Mr. Dutcher thought it probable that this bird had remained through the winter, as it seems to do sometimes, for once before, in February, he and Mr. Foster had found the remains of one not long killed.

Mr. L. S. Foster read a newspaper clipping stating that bounty had been paid in Maine on 20,032 crows, during 1889-90, and that the appropriation was already exhausted for 1890.

Mr. Geo. B. Sennett said he had come into possession recently of a well-marked hybrid between the Scaled Partridge (*Callipepla squamata*) and the Bob-white (*Colinus virginianus*).

Mr. J. A. Allen had recently seen a hybrid between the Purple Finch (*Carpodacus purpureus*), and the Pine Grosbeak (*Pinicola enucleator*), shot at Toronto, Ont., in a flock of the latter.

JONATHAN DWIGHT, JR.,
Secretary.

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THOS. W. WILSON.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

FOR THE YEAR ENDING MARCH 6, 1891.

OFFICERS.

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| <i>Vice-President,</i> | FRANK M. CHAPMAN. |
| <i>Secretary,</i> | JONATHAN DWIGHT, JR. |
| <i>Treasurer,</i> | L. S. FOSTER. |

The Society meets on the first and third Wednesday evenings of each month at the American Museum of Natural History, Central Park, New York City.

ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
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This is the third year that an 'Abstract' has been published and it has been deemed advisable to append an index covering the three years. The purpose of the 'Abstracts' is to furnish members of the Society with a brief review of the year's work, most of the papers read before it finding prompt publication elsewhere in well-known scientific journals. To such due reference is made in the text.

March 21, 1890.—The President in the chair. Ten persons present.

Mr. Wm. Dutcher read an extended paper on 'Birds observed at Little Gull Island.' [Forest and Stream, Vol. xxxiv, pp. 246-7 and 267.]

Dr. G. L. Nicholas suggested a method of skinning young birds still in the downy stage. An incision may be made from the back of the skull to a point between the shoulders and the body turned out through it. The skin is then inflated by the breath and kept in shape while drying by a bit of cotton.

Mr. Sennett in speaking of the breeding of Terns in Texas, stated that the Least Terns (*Sterna antillarum*) lay their eggs on sand-bars in the Rio Grande where the constantly recurring rises in the river

wash them away as many as twenty or thirty times in a single season and yet the Terns fail to learn wisdom by experience. Several present spoke of the diminished numbers of Terns now found along our coast, owing chiefly to their merciless persecution by persons who shoot them for the milliners.

Mr. Dutcher exhibited a number of Marsh Wrens from Georgia, the majority being *Cistothorus marianæ*. This species had never been taken before north of Tarpon Springs, Fla. [See a record for South Carolina, Auk, VIII, 1891, p. 239.]

April 4, 1890.—Mr. Geo. B. Sennett in the chair. Six persons present.

Mr. Foster recorded the capture of the European Widgeon (*Anas penelope*) at Carroll's Island, Md., Feb. 25, 1890. [Auk, VII, 1890, p. 283.]

Mr. Dutcher exhibited a Cedar Bird (*Ampelis cedrorum*) remarkable in having part of an extra tail. Two rectrices inserted upside down grew from the back just anterior to the insertion of the normal tail.

May 2, 1890.—The president in the chair. Ten persons present.

Mr. J. Dwight, Jr., presented an extended paper entitled 'Some impressions of Birds of the New Jersey Coast.' It comprised a list of 103 species, largely 'Shore Birds,' seen mostly during the summer of 1878 at a once famous gunning resort on Barnegat Bay. A railroad and summer cottages have since invaded the sandy and marshy wastes where formerly large colonies of Terns bred, and many species of waterfowl resorted, unmolested save by the enterprising sportsman.

May 16, 1890.—The President in the chair. Ten persons present.

Mr. W. E. D. Scott gave an informal account of his recent trip to the region east of Cape Sable, Florida, and to the Dry Tortugas. His notes have since been published. [Auk, VII, 1890, pp. 221-226 and pp. 301-314.]

Mr. Chapman related some of his observations made at Gainesville, Fla., chiefly on the mammals inhabiting floating islands. These islands are formed first of lily stalks torn up by alligators. Seeds falling upon the floating bunches of stalks soon sprout and form a tangle of roots that increases in size from year to year. They are frequented by Marsh Hares and form the resorts of the rare *Neofiber alleni*.

Dr. C. S. Allen gave a brief outline of a recent trip down the

Suwanee River, Fla., in company with Mr. Wm. Brewster and Mr. F. M. Chapman. Birds were comparatively scarce but an Ivory-billed Woodpecker (*Campephilus principalis*) and about forty Bachman's Warblers (*Helminthophila bachmani*) were obtained. One night in March ice formed and all the budding shoots were killed. [See Auk, VIII, 1891, pp. 125-138 and pp. 149-157.]

Mr. Chapman had recently watched a specimen of *Helminthophila leucobronchialis* and heard it sing repeatedly. Its song hardly differed from that of *H. pinus* [Auk, VII, 1890, p. 291].

Mr. Scott stated that he had observed a difference of two months in the leafing of a particular water oak at his home in Florida.

It was the opinion of those members who had been in the field this season that the spring migration had been unusually early and was already over.

October 3, 1890.—The President in the chair. Six persons present.

Mr. Dwight read from his note-book an account of a night (Sept. 18-19, 1890) spent on Bedloes Island, New York Harbor, with Messrs. Dutcher and Foster observing the migrating birds attracted within the rays of light from the brilliantly illuminated Statue of Liberty. About twenty species were noted among the several hundred birds seen. Few struck with force enough to be killed, the majority fluttering up and down the masonry so confused as to allow themselves to be caught in the hand.

October 17, 1890.—The President in the chair. Seven persons present.

Mr. F. M. Chapman presented a paper, on 'The North American element in the West Indian Avifauna and the West Indian element in the North American Avifauna.' Certain North American species through a continued residence in the West Indies have become differentiated from the parent forms; the West Indian species which visit North America, however, being migratory, show little or no change from the island forms.

November 7, 1890.—The President in the chair. Eleven persons present.

Mr. Arthur H. Howell read a paper on the 'Birds of Eliot, Maine.' The time covered was from August 4-14, 1890.

Mr. Basil H. Dutcher, who had recently returned from the Government Biological reconnaissance, under Dr. C. Hart Merriam, to Idaho, gave a summary of what the expedition accomplished. A

full account may be expected in a forth-coming number [‘No. 5’] of the ‘North American Fauna.’

Dr. C. S. Allen exhibited two Ground Rattlesnakes, a Moccasin, and a Hog-nosed Snake, all alive.

November 28, 1890.—The President in the chair. Seven members present.

Mr. J. Dwight, Jr., read a paper entitled, ‘The Crest of the Alleghanies of Pennsylvania and Birds found there in Summer.’ It was the record of a week spent during the latter part of June, 1890, at an elevation of about 2,000 feet, where a number of species of the Canadian avifauna were found breeding, such as Hermit Thrushes, Juncos, Black-and-Yellow Warblers, Water Thrushes (*Seiurus noveboracensis*), and others. The sixty-six species noted are chiefly Alleghanian, and none of the numerous Carolinian species found at Carlisle in 1844 by Baird, were seen. Carlisle is, however, at a much lower altitude and lies near the eastern base of the mountains. Comparison was made with Baird’s list.

Regarding a trip made with Mr. Dwight in June to High Knob, New Jersey, the highest point in the State, Mr. Chapman remarked that the avifauna there was Alleghanian with a strong tinge of the Carolinian. The only suggestion even of the Canadian was the presence of *Vireo solitarius*.

December 5, 1890.—The Vice-President in the chair. Six persons present.

Mr. L. S. Foster presented a paper upon ‘The Snowy Owl.’ It treated of the species from various points of view, giving in detail its history arranged under heads such as its names, its nest, its cry, its weight, its natural food, its migrations, etc.

Mr. Dutcher reported a second instance of the Barn Owl (*Strix pratincola*) breeding on Long Island. [For the first record see Auk, III, 1886, p. 439.]

Mr. Chapman quoted from an article in ‘Blackwood’s Magazine’ deploring the destruction of birds by milliners’ agents on the island of Jamaica and of the eggs of ground-nesting species by the Mongoose, imported into the island to protect the plantations from the ravages of rats. As a result the insect pests are said to have become well-nigh insufferable.

Mr. Chapman also made some critical remarks upon a recent list of the Birds of New Jersey. [Auk, VIII, 1891, p. 104.]

December 19, 1890.—The President in the chair. Ten persons present.

Mr. Geo. B. Sennett occupied the evening with a paper on 'Water Birds that live in the Woods.' About a dozen species were dealt with, the most interesting of them perhaps being the Tree Ducks (*Dendrocygna autumnalis et fulva*). The former is found in the heaviest timber along the Rio Grande of Texas, at Lomita, and as this river furnishes no sort of food, it adapts itself to circumstances and feeds upon seeds or grain. These ducks will alight upon a stalk of growing corn with the ease of a blackbird and are quite at home among the lofty trees where they make their nests. They do not resort to the river which is so cold and muddy, from the melting snows of the mountains whence it flows, that all vegetable and animal life save the garpike is wanting. No ducks of any kind are found upon it.

A flock of Cormorants, about four miles long and one and one-half a mile wide, was once seen by Mr. Sennett in Minnesota.

Mr. Sennett reported the capture of a Limpkin (*Aramus giganteus*) near Brownsville, Tex., May 29, 1889, the first record for the west Gulf coast. It was a fine adult male and the bird was not known to the natives or gunners who saw it when shot.

Mr. Chapman presented some remarks upon the Gopher or Salamander (*Geomys tuza*) of Florida, illustrated with specimens of this as well as allied species. Their retiring habits, burrowing beneath the ground as they do, render them far less well known than they should be, considering how abundant they are in many parts of the peninsula. There is no more familiar sight in the pine woods than the mounds of earth they throw up, in forming their burrows. They have pouches on either side of their mouths opening externally instead of internally as some people suppose.

Dr. J. A. Allen gave an interesting explanation of how traces of Sonoran life might be geologically accounted for in Florida, the Gopher being a case in point.

January 9, 1891.—The Vice-President in the chair. Eleven persons present.

A letter from Mr. Arthur H. Norton furnishes a record (the 6th) of the Leather-backed Turtle (*Sphargis coriacea*) in New England waters,—a specimen secured August, 1890, in Penobscot Bay, Maine.

The capture of a Glaucous Gull (*Larus glaucus*) at Far Rockaway,

Jan. 1, 1891, by Messrs. A. H. Howell and L. S. Foster, the third record for New York State, was reported. [Ornith. and Oologist, XVI, 1891, p. 61.] Mr. Foster stated that the food of the immense flocks of Herring Gulls seen on Long Island in winter seemed to consist mainly of the quahog clam. He also spoke of the unusual abundance of the Snowy Owl (*Nyctea nyctea*) this winter all along the coast as far south even as Delaware. One was seen in Central Park, New York City, about the middle of December.

Dr. Morris called attention to a habit he had noticed of the Ruffed Grouse (*Bonasa umbellus*) feeding in winter upon the leaves of Bishop's Cap (*Tiarella*). They seem to prefer these leaves, which persist green, to any other food, and in western swamps feed exclusively upon them, as proved by examination of their crops.

Mr. Chapman described the notes of the Virginia and Sora Rails, and the Florida Gallinule, as recently observed by him in the Fresh Pond marshes, Cambridge, Mass. [Mr. Wm. Brewster's article on the Florida Gallinule, Auk, VIII, 1891, pp. 1-7, is of interest in this connection.]

Dr. C. S. Allen occupied the evening with an informal paper upon the habits of some rattlesnakes and other snakes that he had in confinement. He showed specimens of the venom, fangs, etc., and also introduced a King Snake and a Hoop Snake alive, both harmless species, to show how they had acquired, by living in bad company, the habit of striking in imitation of their poisonous associates.

January 16, 1891.—The President in the chair. Twelve persons present.

Dr. J. A. Allen presented an extended paper entitled, 'Geographical Distribution of North American Mammals', illustrated with maps and charts. The mammalian fauna of North America was first compared with that of northern Europe and Asia and then discussed in detail in respect to the lesser faunal areas of the continent. Colored maps were shown illustrating the distribution of the North American Hares.

February 6, 1891.—The President in the chair. Sixteen persons present.

Mr. Leverett M. Loomis read a paper entitled 'An Historical sketch of South Carolinian Ornithology'. [This has been published by the author as a separate pamphlet.]

A letter from Mr. H. A. Cash of Pawtucket, R. I., was read giving

the contents of the stomachs of 74 owls and 10 hawks. Their food had consisted chiefly of small mammals.

Mr. F. M. Chapman read a paper on 'The Mammals of the East Coast of Florida.' Remarks were made upon the habits and distribution of most of the species hitherto found at Micco on the East peninsula. Specimens were shown illustrating many of the species.

Mr. Loomis exhibited a copy of the first volume of Audubon's 'Ornithological Biography' printed in Philadelphia but differing from the usual Philadelphia edition in important particulars. [Further details may be found in Auk, VIII, 1891, p. 230.]

Mr. Dutcher exhibited a skin of the Blue-striped Trigger Fish, captured in November, 1890, at the Ditch Plain Life Saving Station, Long Island, N. Y., by Mr. Wm. L. Baker, one of the crew. He spoke of one taken at Woods Holl, Mass., described and figured in 'Forest and Stream', January 29, 1891. Dr. John I. Northrop, stated that this was a common fish in the Bahamas, and that when the second or rear dorsal spine was erected, the first was locked firmly in its raised position.

February 20, 1891.—The Vice-President in the chair. Nineteen persons present.

Mr. Leverett M. Loomis presented a paper entitled "Remarks on the Song Seasons of some South Carolina Birds." The resident song birds were divided into three classes, those having a single song season, those having a second song season after the breeding season, and those singing all the year round. The Field Sparrow (*Spizella pusilla*) is the type of the first, the Mocking-bird (*Mimus polyglottos*) that of the second, and the Carolina Wren (*Thryothorus ludovicianus*) that of the third class. Mr. Loomis will incorporate this paper in a more extended one upon which he is working.

Mr. Wm. Dutcher presented a paper entitled 'The Labrador Duck. A revised list of the extant specimens in North America with some historical notes.' [Auk, VIII, 1891, pp. 201-216.]

March 6, 1891.—Annual Meeting. The President in the chair. Fifteen persons present.

The following officers were elected for the ensuing year. President, Dr. J. A. Allen; Vice-President, Mr. Frank M. Chapman; Secretary, Mr. Jonathan Dwight, Jr.; Treasurer, Mr. L. S. Foster.

After having enjoyed the hospitality of the American Geographical

Society for the past ten years, the Linnæan Society resolved to accept an invitation from the President and Board of Trustees of the American Museum of Natural History, and to hold its meetings in future at the Museum. The advantages of such a change are obvious.

Mr. Sennett made some remarks upon his recent trip to Albany on behalf of bird-protection. The proposed new law will repeal 174 old ones and promises to be an excellent one, although it outlaws cranes, hawks, owls, shrikes, English Sparrows, blackbirds and crows. Of 28 species of hawks and owls found in the State, only five are proved to be foes of the farmer. The usefulness of crows and blackbirds is still questionable.

Mr. J. Dwight, Jr., presented a paper entitled '*Junco carolinensis* shown to be a sub-species,' and exhibited a series of specimens taken from Cape Breton to North Carolina. [Auk, VIII, 1891, pp. 290-292.]

Dr. C. S. Allen supplemented his paper of January 9th, with additional facts about his dangerous pets, and thrilled those present by shaking out of a bag a large rattlesnake and a moccasin alive, and then endeavoring to provoke them to coil and strike.

JONATHAN DWIGHT, JR.,
Secretary.

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ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

FOR THE YEAR ENDING MARCH 2, 1892.

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The Society meets on the first and third Wednesday evenings of each month at the American Museum of Natural History, Central Park, New York City.

A B S T R A C T
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK.

FOR THE YEAR ENDING MARCH 2, 1892.

This is the fourth in the series of "Abstracts" published by the Society, and like the preceding numbers, is intended merely as a brief review of the year's work, only the more important points in the papers read before the Society being mentioned here. Some of the papers have been printed in full elsewhere, and in such cases, a reference is here given to the place of publication.

March 18, 1891.—The President in the chair. Ten members and seven visitors present.

The Secretary read a paper by Mr. Wm. Dutcher, entitled, "Some Leaves from my Long Island Note Book," being an account of a trip made to Amityville, L. I., Feb. 22, 23, 1891. Twenty-three species were noted. A Sharp-tailed Sparrow (*Ammodramus caudacutus*) which was taken, had evidently wintered on Long Island. Mr. Dutcher purchased the skin of a Cardinal Grosbeak (*Cardinalis cardinalis*) which had been shot by Mr. Wilson at Seaford, L. I., Dec. 1, 1890—the first actual record for Long Island.

Mr. L. S. Foster presented a paper entitled "A Glance at North American Ornithological Literature, 1870 to 1880," being an extended

résumé of the more important papers of that period, which was a most fruitful one.

Dr. J. A. Allen presented a paper upon the "Mammals of Costa Rica," based upon a collection made by Mr. Geo. K. Cherrie. Among the specimens exhibited were several representing species new to science. [Bull. Am. Mus. Nat. Hist., Vol. iii, pp. 203-218.]

April 1, 1891.—The President in the chair. Ten persons present.

Mr. Geo. B. Sennett presented a paper on "The Quails of the United States," illustrating it with a large series of specimens. The habitat and characteristic habits of each species were considered in detail. He referred to the fact that it is now difficult to obtain skins of Quails worthy of credit as testimony in the problem of geographical distribution, owing to the fact that many live birds have been introduced into various parts of the country, and these interbreed with the local races. As evidence of this, he stated that a Florida Quail has been taken in Michigan.

Colinus virginianus ridgwayi is the most recent addition to our fauna in this group. The type is in the collection of Mr. G. Frean Morcom, of Chicago. Mr. Sennett had before him six male skins, one male head and six female skins of this species; it approaches *C. v. mexicanus* and even more southern forms, but the female strongly resembles the female of *C. v. texanus*, whose habitat is separated from that of *ridgwayi* by a lofty mountain chain, and *texanus* occupies a lower altitude, as well. The call notes are, according to Mr. Wm. Brewster, the same as those of *virginianus*.

Among the oddities of Quail life, Mr. Sennett exhibited albinistic and melanistic specimens of the common Bob-white, of an albino Florida Quail, and a hybrid between *C. v. texanus* and *Callipepla squamata*.

In the course of his remarks, Mr. Sennett stated, on the authority of Mr. Elliot, that the Bob-white had been known to migrate, especially in the northern portion of its habitat, which statement was questioned by some of the members, who considered that accounts of the migration of this bird needed confirmation.

Mr. Sennett also read some bird notes from the note book of Samuel E. Bacon, Jr., of Erie, Pa. He tells of a Crow (*Corvus americanus*) killing a Flicker (*Colaptes auratus*), and notes four specimens of the Pileated Woodpecker (*Ceophlæus pileatus*) taken near Erie. He also states that the "Blue-bill Duck" (*Aythya marila nearctica*) has been

caught on Lake Erie in fish nets, one hundred and fifty feet below the surface.

April 15, 1891.—The President in the chair. Seven members and two visitors present.

The capture of a Barn Owl (*Strix pratincola*) at Chatham, N. J., Nov. 8, 1890, was recorded by Mr. Dwight.

Dr. J. A. Allen occupied the evening with a paper on "A Collection of Mammals from Texas and Northeastern Mexico." A large number of specimens was shown, their differences pointed out, their rarity noted and their habitats defined. Among them was a specimen of the Red Cat (*Felis eyra*) now taken for the first time north of the Rio Grande, and a specimen of *Sciurus arizonensis*—the only record of this species in Texas. [See Bull. Am. Mus. Nat. Hist., Vol. iii, pp. 219-228.]

May 6, 1891.—The President in the chair. Seven members and four visitors present.

Mr. Geo. K. Cherrie presented an informal paper on "The Birds and Mammals of Costa Rica," giving descriptions of the country and the characteristics of the people, as well as a general account of the abundant animal life.

Although Costa Rica is only about half the size of New York State, its list of birds numbers 730 species. It is a country of forests and of all sorts of climates, from the torrid sea-coast to that found at an elevation of 11,500 feet, the top of the volcano Irazú, where ice forms.

The trees are not deciduous, although their leaves fall in part during the dry season, which extends from October to May. At the end of the rainy season, many North American migrants appear, and as the dry season advances they retreat to the coast region, and are not seen again till another year.

Bird life is more abundant during the wet season, for the reason that fruit and insects abound at that period. The breeding season nearly corresponds with that of the United States.

Mr. Cherrie spent three weeks on the west coast, and noted while there, 214 species of birds. Near San José, at an elevation of 5000 feet, are what are called "the prairies," about 5 miles square. They become flooded to the depth of about an inch from September to February, and on them are found a number of species of water fowl and waders. *Actitis macularia* remains to breed, and *Totanus*

solitarius is supposed to breed, as it is present all the year. The Mallard, the Ruddy and the Muscovy are common ducks

May 20, 1891.—The President in the Chair. Ten members and four visitors present.

Mr. F. M. Chapman described his recent trip to Corpus Christi, Texas, where he remained five weeks, and recorded 190 species of birds. He secured a series of skins of the Wood Rat (*Neotoma micropus*) which he found breeding in the chaparral and also near the bushes in the open prairie. The nests had from two to five openings. [See Bull. Am. Mus. Nat. Hist., Vol. iii, pp. 315–328.]

Mr. W. E. D. Scott presented an account of a trip made to the Island of Jamaica, November, 1890, to April, 1891. [Auk, viii, 1891, pp. 249, et seq.]

Dr. C. S. Allen gave an account of his recent experiences at Oak Lodge, Fla., and of his journey to that point. Near there he observed a colony of Pelicans (*Pelecanus fuscus*) and secured some photographs of them, as well as of their nests and eggs. He exhibited the skin of a diamond-backed rattlesnake shot near there by Mr. Chas. F. Latham, in November, 1890. The snake before skinning measured eight feet, five inches in length, and fifteen inches in circumference.

Mr. Chapman spoke of a rattler eight feet, nine inches long, killed by Mr. J. H. Norton of Jacksonville, Fla.

Mr. A. H. Howell read a list of the spring migrants, with the dates of arrival, that he had observed the past season near Brooklyn, N. Y.

Mr. W. E. D. Scott remarked that warblers were numerous at Pocantico, N. Y., this spring. He had taken *Helminthophila leuco-bronchialis* and an *H. pinus* with a dusky throat, approaching *H. lawrencei*.

Mr. B. H. Dutcher read a list of birds received from the keeper of Fire Island Lighthouse, L. I., the birds, 231 in number, having been killed during the early morning hours of May 19, 1891. The list included twenty species; *Geothlypis trichas* was represented by 115 individuals, and *Seiurus noveboracensis* by 42.

October 7, 1891.—The President in the chair. Nine members and one visitor present.

Mr. F. M. Chapman presented a paper entitled "Remarks on the Grackles of the sub-genus *Quiscalus*." [Bull. Am. Mus. Nat. Hist., Vol. iv, pp. 1–20.]

October 21, 1891.—The Vice-President in the chair. Eight members and three visitors present.

Three papers relating to Long Island birds were read ; one by Mr. A. H. Howell, upon the birds seen by him at the western end of Shinnecock Bay, August 24 to 29, 1891 ; one by Mr. Wm. Dutcher, upon the birds seen on Great South Bay, from September 17 to 24, 1891 ; and Mr. L. S. Foster presented some notes on a trip made to Amityville, Sept. 7, 1891.

Mr. Dutcher stated that a small breeding colony of Laughing Gulls (*Larus atricilla*) was located on Cedar Island, in the Great South Bay—probably the only one now left in this vicinity. He had observed a flock of fully one hundred Cormorants (probably *Phalacrocorax dilophus*) migrating high in air on September 21, 1891.

The frequent capture of *Ereunetes occidentalis* on Long Island was referred to.

November 4, 1891.—The President in the chair. Eleven members and one visitor present.

Dr. J. A. Allen presented a paper on "The North American Species of the Genus *Colaptes*, considered with Special Reference to the Relationships of *Colaptes auratus* and *Colaptes cafer*." [Bull. Am. Mus. Nat. Hist., Vol. iv, No. 1, pp. 21-44.]

Mr. Chapman showed a specimen of *Colinus virginianus floridanus* taken in New Jersey.

Dr. J. A. Allen exhibited alive, a rare turtle from Minnesota—*Emys meleagris*, and also the skin of a new Grackle from Nicaragua, recently described (from other specimens) in the "Ibis" as *Quiscalus nicaraguaensis*.

November 18, 1891.—The President in the chair. Twelve members and eleven visitors present.

Mr. Henry Hales presented a brief paper, suggesting the reason why the Goldfinch (*Spinus tristis*) breeds so late in this vicinity. He attributed the habit to its love for the seeds of the dandelion, and gave it as his opinion that the birds move from one locality to another during May and June in order to follow up the seeding of this plant.

Mr. Jonathan Dwight, Jr., brought up the subject of birds seen at night around the Statue of Liberty, by asking for the views of those members who had recently passed a night with him on Bedloe's Island. Mr. F. M. Chapman read his notes written the day following the visit, and Mr. L. S. Foster and Dr. C. S. Allen made some

remarks on their impressions of the trip. The latter had found a single bat, with its neck broken, at the base of the Statue.

Dr. C. Hart Merriam made some remarks upon bird migration; he was satisfied that in migrating, birds rely mainly upon the power of sight, and stated that while darkness obscures minor details of topography, it brings into prominent relief the more important landmarks, as water courses and mountain ranges, the natural guides in passing from one region to another. He stated further that birds rarely migrate singly or in compact flocks, but in scattered assemblages made up of many species and comprising individuals of all ages. On favorable nights the call notes of such birds may be heard at frequent intervals, and all moving in a common direction. A young bird in setting out on its first migration has only to launch into the air to find itself in company with a moving host whose notes it can easily follow.

Mr. Hales spoke of a mesh-wire fence, eight feet high, in his yard, against which birds have occasionally been killed in the daytime; he has picked up dead Cedar Birds (*Ampelis cedrorum*), and once, a Yellow-billed Cuckoo (*Coccyzus americanus*).

Mr. L. M. Loomis referred to a deposit of bat guano, containing thirty-two bushels and three pecks, found in a loft near Chester, S. C.

December 2, 1891.—The Vice-President in the chair. Nine members and four visitors present.

Mr. Wm. A. Robbins was introduced by Mr. Foster, and presented a paper on the *Falconidæ* breeding in southwestern Santa Clara Co., Cal., where he had collected for two seasons. Some of the eggs taken were exhibited. *Elanus leucurus* breeds regularly; *Buteo borealis calurus* is abundant, and *Aquila chrysaetos* is not uncommon, nesting on cliffs or in tall trees. One nest of *Falco mexicanus* was found. *Falco sparverius* was very common, and persisted in laying in the deserted nests of the Magpie.

Mr. L. S. Foster presented a paper on "Bird Myths," drawing his material from the classics, and recent ethnological publications.

Mr. Wm. Dutcher reported two Dovekies (*Alle alle*), recently taken on Long Island—the first since 1882. He considers this species and the Puffin (*Fratercula arctica*), among the rarest of the boreal birds that visit Long Island.

December 16, 1891.—The Vice-President in the chair. Ten members and three visitors present.

Mr. Geo. B. Sennett presented some remarks upon the birds of Corpus Christi and Nueces Bay, Texas, followed by Mr. F. M. Chapman, with notes from his journal of a visit to Corpus Christi in April, 1891.

The latter had observed Swallows following a person walking on a marsh, being attracted by the insects he aroused. Mr. Dutcher had noticed the same habit in the Swallows, on Long Island.

January 6, 1892.—The President in the chair. Eleven members present.

Mr. Jonathan Dwight, Jr., presented an important paper, entitled, "Summer Birds of the Crest of the Pennsylvania Alleghanies." [See Auk, Vol. ix, No. 2, pp. 129-141.]

Messrs. Wm. Dutcher, L. S. Foster, A. H. Howell and L. M. Loomis related the incidents of a trip made to Long Beach, L. I., January 1, 1892. Photographs, taken by Mr. Dutcher, were shown.

January 20, 1892.—The President in the chair. Six members and two visitors present.

Dr. J. A. Allen read a paper entitled "Definite *versus* fortuitous variation," the paper having special reference to geographical variation in North American mammals and birds. Of North American bird forms, the following were cited in illustration: *Colinus*, *Pipilo*, and *Melospiza fasciata*, the latter particularly in trans-continental variations.

A spirited discussion of evolution followed, all the members present taking part.

Mr. Wm. Dutcher read extracts from correspondence received from the lighthouse-keepers at Fire Island Lighthouse and the one on Montauk Point, bearing on bird migration during the night of May 20-21, 1891. At substantially the same hour birds began to strike at each place, and likewise ceased at the same hour. These lights are distant from each other about eighty miles. He considered that the Spring migration on Long Island was a little to the north of due east, and that the birds take advantage of the line of islands at the eastern end of Long Island, in order to easily reach the Connecticut shore.

February 3, 1892.—The President in the chair. Nine members and one visitor present.

Mr. L. M. Loomis presented a paper on "The Organization, Career, and Publications of the Elliott Society of Science and Art of Charleston, S. C."

At the request of the Chair, Mr. Loomis made some remarks upon bird migration. The subject was discussed at length by others.

Mr. Wm. Dutcher considered that the appearance in the autumn of the Long-billed Curlew (*Numenius longirostris*), as well as of the Willet (*Symphemia semipalmata*) and the Black Skimmer (*Rhynchops nigra*), could be accounted for only by supposing a northward movement after breeding. It was his opinion that the occasional flights of Black Terns (*Hydrochelidon nigra surinamensis*) come from the West, where these birds are common.

Mr. F. M. Chapman spoke of the appearance of Spoonbills (*Ajaia ajaja*)—adults and birds of the year—at Corpus Christi, Texas, early in April. This species arrives after having bred in some other locality.

February 17, 1892.—The President in the chair. Nine members and four visitors present.

Mr. B. H. Dutcher read a paper entitled "A Summer's Collecting in Southern California," illustrating it by an extensive series of photographs taken by himself during this trip, —June to September, 1891. After crossing the Mojave Desert, Mr. Dutcher, outfitting at Keeler, camped on the banks of Big Cottonwood Creek, and from thence, made the ascent of Mt. Whitney. Breaking camp, September 15, a visit was paid to Death Valley, where a camp of Piute Indians was visited, and a number of photographs of the region taken.

Mr. Wm. Dutcher gave an account of the habits of a Short-eared Owl (*Asio accipitrinus*), which he held in captivity for a month in the fall of 1891. During this time it did not become appreciably tamer.

March 2, 1892.—Annual Meeting. The President in the chair. Eleven members and one visitor present.

The following officers were elected for the ensuing year. President, Dr. J. A. Allen; Vice-President, Mr. Frank M. Chapman; Secretary, Mr. Arthur H. Howell; Treasurer, Mr. L. S. Foster.

Mr. L. M. Loomis presented a paper entitled "A Theory of Migration." This paper was but a part of a more extended one to appear later, and dealt only with cold and food as factors influencing the southward migration of birds. The theory advanced was that food supply was the chief factor to be considered, cold influencing the southward movement in so far only as it occasioned a lack of food.

ARTHUR H. HOWELL,
Secretary.

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1892.

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1892-93.

No. 3.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

For the Year Ending March 1, 1893,

WITH A PAPER

BY TAPPAN ADNEY

ON

“Milicete Indian Natural History.”

The Society meets on the first and third Wednesday evenings of each month at the American Museum of Natural History, Central Park, New York City.

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OF
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No. 1, for the year ending March 1, 1889, 8vo., paper cover, 9 pp.

No. 2, " " " 7, 1890, " " 10 pp.

No. 3, " " " 6, 1891, " " 11 pp.

No. 4, " " " 2, 1892, " " 8 pp.

No. 5, " " " 1, 1893, " " 41 pp.

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March 16, 1892.—Mr. L. S. Foster in the chair. Nine members and eight visitors present.

Mr. L. S. Foster presented a paper on "The Winter Birds of the Vicinity of New York City," illustrating it with a map of the locality under consideration, which included all the territory within a radius of 50 miles of the New York City Hall, lengthened out to the eastward, however, 65 miles further, so as to include the whole of Long Island. The prominent points on the boundary line are Trenton, N. J., Newburg, N. Y., Bridgeport, Conn., and Montauk Point, Long Island.

The list comprised 127 species that have occurred in this

district during the months of December, January, and February. Following is an epitome of Mr. Foster's notes on the rarer species, and on the most notable records.

The Puffin (*Fratercula arctica*) is a rare visitor from the North; recorded from Centre Moriches, L. I., December 15, 1882.

The Dovekie (*Alle alle*), which is quite irregular in its appearance, was fairly common during December, 1891.

A Great Blue Heron (*Ardea herodias*) was shot at Bridgeport, Conn., in January, 1884, by Mr. C. K. Averill, and Mr. C. C. Young found one dead on Far Rockaway Beach in December, 1891.

Two specimens of the Clapper Rail (*Rallus crepitans*) are recorded from Far Rockaway Beach, one in December, 1884, another in February, 1885.

Wilson's Snipe (*Gallinago delicata*) is unusual in winter; Mr. Foster observed one at Far Rockaway, January 1, 1890.

Mr. Wm. C. Southwick of Raritan, N. J., noted the Killdeer (*Ægialitis vocifera*) at that place about February 22, 1892.

The Mourning Dove (*Zenaidura macroura*) is very rare in winter; there are three records—from Englewood, Chatham, and Princeton, N. J., respectively.

The Yellow-bellied Woodpecker (*Sphyrapicus varius*) has but one record, from Westchester Co., N. Y., winter of 1884-85.

The Cowbird (*Molothrus ater*) is of rare occurrence in winter; Mr. Foster recorded a good-sized flock at Long Beach, L. I., January 1, 1892.

There are few published records of the occurrence in winter of the Sharp-tailed Sparrow (*Ammodramus caudatus*); Mr. Foster killed one at Far Rockaway, February 23, 1885.

The Seaside Sparrow (*Ammodramus maritimus*) is also rare in winter, Mr. N. T. Lawrence recording one from Far Rockaway, February 22, 1884.

There are two records of the Field Sparrow (*Spizella pusilla*), one from Setauket, L. I., January 31, 1885, and one from Englewood, N. J., December 25, 1885.

A singular record is that of a Catbird (*Galeoscoptes carolinensis*), at Fort Hamilton, L. I., December 30, 1882.

A few solitary Brown Thrashers (*Harporhynchus rufus*) remain here during the winter, having been seen at Englewood, N. J., on two occasions, and in Central Park, New York City.

Mr. B. H. Dutcher remarked upon the unusually large number of species found in this region, not only in winter but in summer as well, about one-third of the total number of North American birds having occurred at one time or another within these limits. He said that the Gulf Stream had a moderating effect upon the climate of this region, and spoke of a sheltered swamp on the bar opposite Sayville, south side of Long Island, which rarely freezes solid, and where many birds spend the winter in security.

April 6, 1892.—The President in the chair. Five members present.

Dr. J. A. Allen occupied the evening with remarks upon the Flycatchers of South America, illustrating his talk with a good series of specimens, representing a large number of genera.

In speaking of the seasonal changes in the plumage of South American birds, he said that although the climate is very moist and the country well wooded, the changes in plumage resulting from abrasion and fading are very marked. [See Bull. Am. Mus. Nat. Hist., Vol. iv., Dec., 1892, pp. 331-350.]

Dr. Allen read extracts from letters which he had received from Mr. Jenness Richardson, who was then at Micco, Florida. He reported seeing, about the vessel while leaving New York Harbor, a Gull (*Larus a. smithsonianus*), having several wing feathers missing; the same Gull followed the vessel all the way to Charleston, S. C.

April 20, 1892.—Mr. L. S. Foster in the chair. Five members and two visitors present.

Mr. Arthur H. Howell read a paper entitled "Some Holiday Collecting Trips." It treated in a familiar way of two trips, made by the writer on May 30, 1889 and 1890, respectively, to the central portion of Long Island.

The Pine Warbler (*Dendroica vigorsii*) is a characteristic bird of the locality, arriving early in April and remaining till October. Mr. Howell had been unsuccessful in finding its nest, and queried as to the date of nesting. Mr. Jonathan Dwight, Jr., said that in Massachusetts they breed early in May, and the nest is built in the topmost boughs of a pine.

Mr. Howell had found, in 1889, a nest of the Long-eared Owl (*Asio wilsonianus*) 25 feet from the ground in a small pine. It was a deserted squirrel's nest, much flattened out, and contained three downy young of different ages.

A nest of the Hairy Woodpecker (*Dryobates villosus*) was found in a hole two and one-half feet from the ground in a living oak. It contained four young, two males and two females.

Nests of the Baltimore Oriole (*Icterus galbula*) containing respectively, two and six eggs, were recorded. [See "Ornithologist and Oölogist," March and April, 1893.]

Mr. Jonathan Dwight, Jr., stated that in New Jersey he had found nests of the Mourning Dove (*Zenaidura macroura*) on the Norway spruce, white pine, and apple trees, in the near vicinity of houses; and in Kansas had found two nests in the open prairie.

Mr. B. H. Dutcher had found on Snake River, Idaho, that the bird invariably nested on the ground under the sage brush, although there were wooded tracts that it might have occupied; in the East he had found the nests in scrub-oaks. He stated that the bird is found from sea-level to ten thousand feet altitude.

Several of the members made reports of the migrant birds they had observed, which tended to show that the migration was rather late, and the migrants not very numerous.

May 4, 1892.—The President in the chair. Eight members and four visitors present.

Mr. Frank M. Chapman gave an account of his recent trip to Cuba, where, in the vicinity of Trinidad, on the southern coast of the island, he spent the greater part of March and April, 1892. A full account of his observations and collections will be found in the Bulletin of the American Museum of Natural History, Vol. iv., pp. 279-331.

Dr. J. A. Allen spoke of an interesting new species of Gallinule from Gough Island, off the coast of Africa. He had named the bird *Porphyriornis comeri*. [See Bull. Am. Mus. Nat. Hist., Vol. iv., 1892, p. 57.]

May 18, 1892 —The President in the chair. Nine members present.

Mr. Frank M. Chapman read some notes from T. G. Pearson of Archer, Fla. Among the interesting records was that of a flock of 50 or more Wild Pigeons (*Ectopistes migratorius*). Mr. W. E. D. Scott, however, rather doubted the correctness of the record, and stated that if it were true it was quite remarkable, Florida being out of the range of this bird for the last few years.

Mr. Pearson had found the Sparrow Hawk (*Falco sparverius*) breeding very abundantly, the usual number of eggs being four or five; if robbed, the birds always laid a second set and sometimes a third, usually in the same nest; 19 to 21 days are required to complete a second litter.

Mr. Ernest E. Thompson, who had just returned from an extended trip in Europe, made some remarks on his impressions of European birds. He was struck with the fact that there was no marked Autumn song season, as with us, the only birds singing at that season being the Robin (*Erithacus rubecula*) and the Skylark (*Alanda arvensis*).

Mr. W. E. D. Scott spoke of the destruction of birds in Florida, and said that there had been a marked decrease in the evil during the past few years, and a corresponding increase in the numbers of birds, especially the Herons and

other birds used for millinery purposes. The new law is generally respected, and has a very salutary effect.

Mr. Scott had found Burrowing Owls (*Speotyto cunicularia floridana*) breeding in the prairies (so called) of the Lake Okeechobee region, but not in communities. The ground is quite dry where they are found, and Mr. Scott thought the birds in every case made their own burrows. The eggs are usually five in number, sometimes four, and rarely six or seven.

He found the Caracara Eagle (*Polyborus cheriway*) breeding near Fort Thompson; a nest that he examined on April 13, 1892, contained two young about three weeks old. The usual position of the nest is about 45 feet from the ground, in a pine or palmetto tree.

Wild Turkeys (*Meleagris gallopavo osceola*) are found commonly in droves of five to twenty, and Mr. Scott's observations lead him to conclude that the Turkey will never, on account of the wildness and irreclaimable character of the country, be exterminated in southern Florida. He made some observations on the weight of the Turkeys of that region, which were as follows: males, 12 lbs. to 22 lbs., averaging about 16 lbs; females, $4\frac{3}{4}$ lbs. to $9\frac{1}{2}$ lbs. [See "Auk," Vol. ix, 1892, pp. 209-218.]

October 5, 1892.—The Vice-President in the chair. Seven members and twelve visitors present.

Mr. Jonathan Dwight, Jr., presented some remarks upon the birds of Kansas, being an account of a visit paid to the State in the summer of 1891,—from July 4 to 21. At the close of his remarks he exhibited a number of specimens.

Mr. B. H. Dutcher gave an account of his recent trip through parts of Kansas, Oklahoma, Texas, and New Mexico. He found the eastern limit of the range of the Prairie Dog to be near Wichita, Kansas, and at the same place found both *Sturnella magna* and *S. m. neglecta* breeding, and of course numerous intermediates.

Mr. F. M. Chapman gave some account of his experiences

with the birds of Central Park (New York City), during the past summer. Several unusual birds have been recorded, among them a Red-bellied Nuthatch (*Sitta canadensis*) in June and July, and a Canadian Warbler (*Sylvania canadensis*) in full song, July 1.

The bathing habits of the birds form an interesting feature of their summer life. Mr. Chapman had discovered a little pool which seemed to be a favorite resort, and had watched it quite faithfully. The following species were, excepting the English Sparrows, the most frequent visitors: *Melospiza fasciata*, *Geothlypis trichas*, *Vireo olivaceus*, *Dendroica æstiva*, and *Merula migratoria*. The Vireos differed from the other bathers in the fact that they never entered the water bodily, but, flying from some elevated perch, merely dashed the water over themselves, and were away again.

A rough estimate of the number of Sparrows bathing there per day places the number at 4,000.

On August 29, there occurred the first flight of migrants, and on this same date the birds ceased bathing in the Park, and since then only two have been seen at their summer resort.

October 19, 1892.—The President in the chair. Seven members and nine visitors present.

Mr. Frank M. Chapman presented a paper entitled, "Notes on the Zoölogy of the Voyages of Columbus."

Columbus was not a naturalist, but there are numerous references in his journal to the birds and mammals which he observed on his voyages. Mr. Chapman traced the details of the first and memorable voyage, noting the birds seen at different stages of the voyage, and how Columbus was led to alter his course by reason of meeting a large flight of North American migrants 800 miles from the Bahamas, thus landing at San Salvador instead of Florida.

Mr. L. S. Foster presented a paper on "The Spring Birds of the Vicinity of New York City," the territory being

the same as that covered by his previous paper on winter birds. [See p. 1.]

One hundred and one species were enumerated, with brief notes on each, the paper being not a complete list, but compiled from Mr. Foster's personal records in his field notes, and his collection of bird skins.

Mr. B. H. Dutcher and Mr. F. M. Chapman made remarks upon Mr. Foster's paper, and Mr. A. H. Howell gave a supplementary list of the birds he had noted on Long Island during the spring months.

November 2, 1892.—The President in the chair. Eight members and five visitors present.

Dr. J. A. Allen presented a paper entitled "Classification and Nomenclature of the Life Areas of North America." [See Bull. Am. Mus. Nat. Hist., Vol. iv, Dec., 1892.]

Mr. Frank M. Chapman presented a paper entitled, "An Analysis of the Summer Bird-Life of the Vicinity of New York City, with Remarks on some of the Rarer Species."

Mr. Chapman has found that there are 127 species which can be classed as summer residents, of which 108 are land birds and 19 water birds; 22 species may be considered abundant, 47 common, 31 tolerably common, and 27 rare.

Mr. Chapman has observed 82 land birds the past season, seeing in one day 55. He noted, as being worthy of special mention, a Worm-eating Warbler (*Helmitherus vermivorus*) singing on the Palisades, July 3 and 10.

Helminthophila pinus was found breeding with *H. leuco-bronchialis* on June 12, the nest containing eggs. [See "Auk," Vol. ix., 1892, p. 302.]

The Chestnut-sided Warbler (*Dendroica pensylvanica*) is becoming more common every season; a number may be found breeding in New Jersey, near Englewood. The Carolina Wren (*Thryothorus ludovicianus*) seems also to have extended its range within the past few years, as it is abundant on the eastern slope of the Palisades, from Fort Lee to Piermont. It is restricted, however, to the imme-

diat vicinity of the river valley, and is found only very rarely on Long Island. [See "Auk." Vol. x., 1893, p. 87.]

Mr. Chapman stated that a pair of Duck Hawks (*Falco peregrinus*) nest every year near Yonkers, N. Y. He mentioned, also, the fact that a Mockingbird (*Mimus polyglottos*), evidently an escaped cage-bird, had taken up its abode in the vicinity of the Museum building, and is never found over 100 feet from its roosting place.

December 7, 1892.—The Vice-President in the chair. Eight members and five visitors present.

The following paper was presented, which the Secretary read by title :

"Milicete Indian Natural History," by Tappan Adney. [See end of this Abstract.]

This paper was read in substance before the Society, December 6, 1889, but its publication has been delayed at the author's request.

Mr. Frank M. Chapman presented a paper on "Our Present Knowledge of the Distribution of North American Birds." This paper was based on a bibliography he had compiled of all faunal lists and papers mentioning at least six species, and was arranged by States. By means of a map the number and distribution of the lists by States and countries was indicated. New York takes the lead with 79 titles ; Massachusetts is second, with 78 ; and California third, with 77.

Dr. C. S. Allen presented some notes on Florida, being a verbal account of several trips made to Oak Lodge, just east of Micco, in Brevard County.

He gave a description of the breeding habits of the Pelican (*Pelecanus fuscus*) and showed a number of photographs of the nests, eggs, and birds. The island on which they were found breeding was about 150 feet long by 50 feet broad, and was covered with a dense growth of mangroves, very little land appearing anywhere. The nests here were in bushes, ten to fifteen feet from the ground, and were made of sticks, straw, dry reeds, etc., and held from one to four eggs. The young, on emerging from the shell, are of a size

corresponding with that of the egg, and slate colored, from tint of skin, with apparently scattering hairs (casings) protecting white down, but in a few hours they appear to have increased to several times the bulk of the egg, and become white as soon as the down is freed from the protecting covering ; in a few days they are as large proportionately as birds usually are when a week or two old. This is due, in part, to the power the birds have of taking air into the spaces beneath the skin, which is very loose and capable of being immensely inflated. They remained in the nest but a few days, resting thereafter on the surrounding bushes. On being disturbed they disgorged large quantities of fish, apparently from the œsophagus. The birds begin to breed in March and continue breeding till June.

Dr. Allen spoke of finding a Carolina Wren's nest in a hole which had been cut in a barrel of partially slacked lime standing in a shed.

Mr. Sennett, in remarking upon Dr. Allen's paper, spoke of the breeding of the Pelican on the coast of Texas, upon extensive grass flats.

December 21, 1892.—The President in the chair. Six members and two visitors present.

In reply to a request for papers addressed to the Corresponding Members, three papers had been received, which the Secretary proceeded to read.

The first was by Dr. F. W. Langdon, on "Faunal Changes in Ohio and the Vicinity of Cincinnati, 1838-1892."

The following species have apparently deserted this locality during the period named: *Meleagris gallopavo*, *Tympanuchus americanus*, *Conurus carolinensis*, *Elanoides forficatus*, *Ceophlæus pileatus*, *Campephilus principalis*, *Corvus corax principalis*.

The following species are much less abundant than in former times: *Ectopistes migratorius*, *Progne subis*, *Ampeelis cedrorum*.

On the other hand, the following have become more common during this period: *Molothrus ater*, *Geothlypis*

formosa, *Lanius ludovicianus*, *Chondestes grammacus*, *Dendroica cœrulea*.

Two European species, the Skylark (*Alauda arvensis*) and the House Sparrow (*Passer domesticus*), have been introduced. The Black-throated Bunting (*Spiza americana*), which was considered of doubtful occurrence in Ohio forty years ago, has since become abundant, but in the last decade has again markedly decreased in numbers.

The next paper was from Mr. E. S. Gilbert, of Canaseraga, N. Y., who, in treating of "Faunal Changes," refers to the disappearance of *Ceophlœus pileatus* and *Melanerpes erythrocephalus*, and the scarcity during the breeding season of *Colaptes auratus*, *Sialia sialis*, and *Troglodytes ædon*. He says also that, "Bobolinks and Kingbirds are greatly diminished in numbers," while, "on the other hand, the Shore Lark (*Otocoris alpestris praticola*) is more common than formerly," the reason being its love for regions of cultivated ground. These birds may be expected to arrive in the spring with considerable regularity, never varying more than one day from February 15.

The last paper was by Dr. R. W. Shufeldt, and was entitled, "The Chionididæ, a Review of the Opinions on the Systematic Position of the Family." [See "Auk," April, 1893, pp. 158-165.]

Mr. F. M. Chapman showed a specimen of a new form of *Oryzomys* which he proposed to describe. [See Bull. Am. Mus. Nat. Hist., Vol. v., March, 1893, pp. 43-46.]

January 4, 1893.—The President in the chair. Eleven members and two visitors present.

The first paper of the evening was by Dr. J. A. Allen, "On Former Land Connections of the American Continents."

The second paper, also by Dr. Allen, was "On the Distribution and Relationships of the Pocket Gophers."

Dr. Allen and Messrs. F. M. Chapman and B. H. Dutcher, gave accounts, drawn from personal experience, of the habits of these mammals and the methods employed in trapping them.

Mr. Chapman stated that the Mockingbird that has

frequented the grounds of the American Museum since October 19, 1892, was yet present, notwithstanding the attentions of a visiting hawk. He feeds upon the fruit of the Virginia creeper and of a Chinese ailanthus-like tree.

January 18, 1893.—The President in the chair. Seven members and twelve visitors present.

Mr. Frank M. Chapman read a paper by Miss Florence A. Merriam on "Habits of the Gray Squirrel, and its Susceptibility to Domestication."

This animal is plentiful in the valley of the Black River, and at Miss Merriam's home at Locust Grove, Lewis Co., N. Y., is abundant, occupying the woods which are within sight of her house, and being rarely molested they have become remarkably tame; by coaxing them with corn and nuts, they were enticed into the door-yard and on to the piazza of her house. One female, in particular, which Miss Merriam described under the name of "Gray," grew very tame, accepting food from the hand, and climbing all about one's person.

She had noticed a number of interesting traits in the character of the Squirrels, notably the extreme nervousness they showed when placed in unusual circumstances, or when startled by a sudden apparition or loud sound. They seemed to be guided in their search for food more by smell than by sight, often sniffing about the lawn in a zig-zag fashion, while several nuts lay near by in plain view. Miss Merriam had observed very little friendly intercourse among them.

The Hon. Clinton L. Merriam stated that until recently the Squirrels in the vicinity of his home (at Locust Grove, N. Y.) always occupied inside nests, but within the past few years he had observed a number of spacious outside nests.

Mr. Geo. B. Sennett made remarks upon a collection of birds from northeastern Mexico, illustrated by specimens from his collection. He showed 21 of the Mexican species which are found nearest to the United States border, and told something of their habits and characteristics.

February 1, 1893.—The President in the chair. Ten members and three visitors present.

Dr J. A. Allen made remarks upon the Fox Squirrels of the United States, illustrated by specimens of the animals. He remarked upon the great tendency to melanism in the group, and described the characters of the three geographical races found within our borders.

Mr. Frank M. Chapman presented a paper on "Protective Coloration Among Birds."

Under the head of protective coloration proper, he instanced many cases, notably that of a flock of Parrots flying into a palm tree, whereupon they become almost indistinguishable from their surroundings, although not hidden to any extent by the foliage. He described, as illustrating the fact of the bird's consciousness of its protective coloration, the habit the Cuban Meadow Lark has of turning its back to the observer, and also the remarkable instance narrated by Mr. W. H. Hudson in his "Argentine Ornithology" (Vol. ii., p. 103), of a wounded Bittern (*Ardetta involucris*) which persisted in turning its breast towards its captor, although he endeavored to pass around behind it. The bird, with its slender neck pointing straight upward, could not be distinguished from a reed stalk, except on close scrutiny.

Mr. Chapman said that Dr. John A. Wells, of Englewood, N. J., had recently watched a Woodcock (*Philohela minor*) on her nest, and was fully convinced that she was aware of her resemblance to the surroundings of her nest, for she remained perfectly quiet and allowed of a very near approach; but when a fall of snow came, and Dr. Wells again visited the sitting bird—now a very conspicuous object—she flew before he had approached within gunshot. Under the head of aggressive coloration, whereby a bird is enabled to seek its prey to better advantage by reason of its coloration, Mr. Chapman instanced the Fish Hawk, Gulls, Terns, etc.

The most notable example of protective mimicry is the

European Cuckoo (*Cuculus canorus*), which, by reason of its striking resemblance to a hawk, is able to deposit its eggs in the nests of other birds, while they chatter and scold at a respectful distance.

Mr. A. H. Howell recorded the breeding of *Carpodacus purpureus* on Long Island, as shown by a letter from Mr. A. H. Helme, of Miller's Place, who says it is "a regular but not very common breeder." Mr. Wm. Dutcher confirmed this statement and mentioned the fact of its breeding near Westbury, Queens Co.

Mr. Chapman said that the Mockingbird which had frequented the vicinity of the Museum during the winter had not been seen since January 20.

February 15, 1893.—The President in the chair. Ten members and six visitors present.

Mrs. Olive Thorne Miller read a very interesting paper entitled "A June Study," telling, in her charming and popular style, of a month's study of the habits of the Blue Jay (*Cyanocitta cristata*).

Mr. L. S. Foster said that he had found, upon investigation of the stomachs of the Blue Jays, that at certain seasons of the year they feed largely upon acorns, and Dr. J. A. Allen stated that by the same process he had found that they destroyed large numbers of the eggs of the tent caterpillar.

Miss E. Taylor, upon being introduced by the chair, gave a brief but very interesting account of a recent trip she had made to the Mackenzie River, extending to within twenty miles of its mouth. She exhibited many good photographs taken on the trip, and Dr. Allen showed a number of specimens of birds which she obtained and had presented to the American Museum.

Mr. Frank E. Johnson reported that a Mockingbird (*Mimus polyglottos*) had spent the past winter in the vicinity of Blithewood, L. I.

He also mentioned seeing 3 or 4 Cowbirds (*Molothrus ater*) in the same place on January 23.

March 1, 1893.—Annual Meeting. The President in the chair. Six members and two visitors present.

The Secretary presented his annual report as follows :

“ There have been held during the year 15 meetings, being the full quota, with the exception of the second meeting in November, when by vote of the Society the regular meeting was omitted, in order that the Society might meet with the Scientific Alliance.

“ The average attendance of members for these 15 meetings was 8, and of visitors 5. The total number of persons in attendance during the year was 192, of whom 71 were visitors, and 121 members.

“ The largest number of members present at any meeting was 11, the smallest number, 5 ; largest number of visitors present, 12 ; at two meetings there were no visitors ; largest attendance of both members and visitors, 19, which occurred twice ; smallest total attendance, 5 ; this occurred but once.

“ There have been read before the Society 22 papers, 17 by the resident members, 3. by the corresponding members, and 2 by strangers. Of these 22 papers, 10 were written papers, and 12 more or less verbal and informal.

“ There were on the membership roll at the commencement of the year 75 members, consisting of Honorary, 3 ; Resident, 35 ; and Corresponding, 37.

“ Three Resident members have resigned and five new ones been added, making the total of Resident members 37, and the grand total 77, a gain of two.

“ The library, which has for a number of years been in more or less of a chaotic state, has during the past fall and winter been thoroughly overhauled and arranged on shelves in the hall-way of the upper story of the American Museum.

“ A comprehensive catalogue has been prepared, and an index giving the title of every paper is now under way, and more than half finished. The thanks of the Society are due to Mr. and Mrs. L. S. Foster, Miss Foster, Mr. Walter

W. Granger, and Mr. Edward Carson, who have rendered faithful and efficient aid in this work. There is still opportunity for further assistance in its completion.

"The library, as now catalogued, contains 660 publications; 73 quarto size, 18 royal octavo, and 569 octavo; 46 are bound in cloth, 18 in boards, and 596 in paper.

"It is impossible to tell how many have been added during the year just past, but the catalogue is so arranged that a report of the accessions can readily be made in the future. Perhaps the most notable addition is that of the first volume of Capt. Bendire's "Life Histories of North American Birds."

"The bulk of the library consists of the publications of scientific societies, the files of which are in many cases incomplete. The Secretary would suggest that an effort be made to fill the gaps, and also that the receipt of all publications be acknowledged on printed forms.

"The only publication issued by the Society was its usual 'Abstract of Proceedings,' containing 8 pages. The matter in the hands of the Secretary at the present time would warrant something a little more pretentious for the next year. There were sent out 168 copies of the 'Abstract,' 76 to members, 57 to scientific societies and colleges, 26 to scientific journals, and 9 to individuals."

The Treasurer presented his annual report, showing a balance on hand of \$151.22.

The following officers were elected for the ensuing year :

President, Dr. J. A. Allen.

Vice-President, Mr. Frank M. Chapman.

Secretary, Mr. Arthur H. Howell.

Treasurer, Mr. L. S. Foster.

Mr. L. S. Foster presented a paper on "Avian Classification : Suprageneric Groups."

He illustrated, by means of charts, the classifications adopted by the more prominent systematists from the earliest times to the present day, so far as groups above genera

are concerned ; his illustration of the scheme adopted by the A. O. U. being especially detailed and complete.

Dr. Wm. C. Rives exhibited for identification a specimen in the flesh, which Dr. Allen pronounced to be a species of Tinamou (*Nothurus maculatus*). It is a South American game bird somewhat resembling a Quail, and was undoubtedly brought from the Argentine Republic, as it is reported that a large number of similar birds have been shipped from that country to the New York market.

ARTHUR H. HOWELL,
Secretary.

Milicete Indian Natural History:

*A List of Bird Names, together with a Supplementary
List of Names of Other Animals,*

BY TAPPAN ADNEY.

Two hundred and fifty years ago, when John Smith of Jamestown visited New England, the whole country from the Richelieu eastward to the river St. John in Acadia was occupied by the one great tribe of the Abenaki, composed of several sub-tribes speaking different dialects of one language. There were the Wawenocks, Norridgwoks, Assaguntacooks, Sokokies or Pequakets, and Pennacooks, all of whom have ceased to exist separately. Disheartened, and depleted in numbers by warfare with the whites, the remnants have withdrawn at different times into Canada. To-day there remain only the Penobscots and Passamaquoddies in Eastern Maine, and last, the so-called Milicetes* who occupy the valley of the St. John River in New Brunswick, but also mingle with the Penobscots.

*A corruption of *Malizët* (*Mal-i-zët-ě-wat*, a Milicete), the name applied to them by the Micmacs. They call themselves *Olastügiük*, or People of the *Olastük*, or *Wallastook*, as the river is named on old maps. They are therefore often known by the term St. John River Indians.

The Micmacs* of Nova Scotia and eastern New Brunswick are a separate tribe, speaking a distinct language, although all are members of the great Algonkin family.

The following list of Milicete birds is nearly complete, so far as the Indian names are concerned. Many species not included would, if they came under an Indian's observation, receive some designation. Some species, on the other hand, are known to so few that it is doubtful whether the Indian name should not be classed as a synonym only. It will be seen that the land birds interest them more than the water birds, as befits an inland tribe.

They make no such distinctions as we, the separation being rather into big and little; *Sips* is any large bird whatever, but especially a "duck." A "duck," as they understand the word, has also a wider application and is more synonymous with "water-fowl." *Sipsis*, on the contrary, is any small bird. It may also mean a young water-fowl; thus there is no clear line of separation there. Only the commoner species are given a name, and whenever there is a superficial resemblance between what we regard as widely different species, there is no nominal distinction. Such differences, if noted at all, are treated as not more than individual ones. Inaccuracy of identification and looseness in application of names are therefore matters of course.

Little children, even, show a profound knowledge of natural history, so far as names go, like many of us. Most of the stories their mothers tell them are of the trees, the

*Mr. Chas. G. Leland, whose literary attainments are unquestionable, tells, in "Algonkin Legends of New England," stories of various birds and beasts. Those stories relate to the Penobscots, Passamaquoddies and Micmacs, the legend belonging to each being distinguished respectively by the marks "Pen," "P," and "M." Labelled with an "M" are certain legends undoubtedly not Micmac but *Milicete*, a fact overlooked in the haste with which the book is said to have been prepared. With this explanation the work has an especial interest in this connection, as the tales of birds and animals therein are almost as much Milicete as Passamaquoddy. Note also that his "*Wezowiessis*," the "Blue Bird," is only a "little yellow bird," the American Goldfinch.

four-footed beasts and the birds. As the child grows older he observes more for himself, and of birds he imitates their language. Though familiar with the names and the "literature" of his ornithology, he may never become an observer skillful enough to fit upon the owners the excellent names which he knows. The meaning, too, and the reason why, are likewise difficult to get from most Indians, although it is alleged by those high in authority among us that every name in an unwritten language must carry its meaning with it, so as to be instantly taken apart and understood.

In the following list the writer regrets that he cannot give a translation in every case that represents the meaning of the name with precision as absolute as our language permits, but the difficulties of translation, while not eliminated, have been greatly simplified by reason of the excellent knowledge of English possessed by many Indians of the Milicete tribe.

The spelling is that recommended by the United States Bureau of Ethnology. It should be borne in mind that there is frequently no distinction between the sounds *k* and *g*, *p* and *b*, *s* and *z*, and *tc* and *dj*. In many instances the sound is intermediate. Indians themselves in writing their language in English characters, express either the hard or soft sounds with indifference, more so at the beginning of a word.

The following abbreviated list will serve to explain the more important peculiarities of the alphabet :

| | |
|---|---|
| <i>a</i> , as in <i>father</i> . | <i>o</i> , as in <i>note</i> . |
| <i>ă</i> , as in <i>what</i> , <i>not</i> . | <i>ö</i> , strictly a shortened sound, not equivalent to <i>ö</i> in |
| <i>â</i> , as in <i>all</i> , | English, which is more |
| <i>au</i> , as <i>ou</i> in <i>out</i> . | nearly the sound of <i>ă</i> . |
| <i>c</i> , as <i>sh</i> in <i>shall</i> . | <i>q</i> , as <i>ch</i> in German <i>ich</i> . |
| <i>tc</i> , as <i>ch</i> in <i>church</i> . | <i>u</i> , as in <i>rule</i> . |
| <i>e</i> , as in <i>they</i> . | <i>ŭ</i> , as in <i>pull</i> . |
| <i>ě</i> , as in <i>then</i> . | <i>û</i> , as in <i>butt</i> . |
| <i>i</i> , as in <i>pique</i> . | |
| <i>ĩ</i> , as in <i>pick</i> . | |

PIED-BILLED GREBE.

Podilymbus podiceps (Linn.). *A'zops*.

Akin to *zobeyŭ*, smooth or slippery. Gunners know how difficult it is to shoot a "Hell-diver." "Sartin, very hard to hit," says the Indian.

LOON.

Urinator imber (Gunn.). *Ūg-wim'*, rarely *Ūg-wim'.*

Related to *ŭgrwimŭ*, floating on the water, "like a dead fish"; also to *ŭgwid'n*, canoe.

LEACH'S PETREL.

Oceanodroma leucorhoa (Vieill.). *Mën'-he bi-mëh'-sīt.*

Leach's Petrel, the little "Peter" who skims the surface of ocean with legs hanging downwards is so called, from *mënhebi-mët*, a skimmer, such as squaws use to remove the scum from the surface of the pot of boiling water. Cf. *ne-bi*, water (old Abenaki).

GULL

(Laridæ) in general. *Ki-ahkw'* or *Ki-äkw'.*

Perhaps related to *kiahkwŭ*, straight course.

AMERICAN HERRING GULL.

Larus argentatus smithsonianus Cones. (Adult.)

(1) *Wá-be-ki'-ahkw*, White (*wábecyŭ*)-Gull. Also sometimes

(2) *Wá'-be-it'-sips*, White-"Duck."

TERNs

(*Sterna*, etc.). *Ki-ah'-zīs*, Little-Gull.

DUCK

in general, *Sips*. A loose term as previously mentioned. Context is the only guide to meaning, especially of the diminutives.

RED-BREASTED MERGANSER.

Merganser serrator (Linn.).

(1) *Kwsig'-kŭh*. A name applied also to an undetermined species of water insect. Another name is

(2) *Ya'-li-bŭg-wi-mŭs'-sīt*, likewise the name of a certain water insect that circles about on the "surface of the water." (Cf. *ŭgrwimŭ*.)

AMERICAN MERGANSER,

Mergus americanus (Cass.), also shares these names.

HOODED MERGANSER.

Lophodytes cucullatus (Linn.). *Hug-wûns'*.

On authority of Governor Noel Paul. Meaning not learned.

MALLARD.

Anas boschas Linn. *Kw'hěs* or *Gw'hěs*.

Identified by Gov. Noel Paul. Neither this nor the preceding are commonly known.

BLACK DUCK.

Anas obscura Gmel. *Mût'-ă-hěh'-sim*.

PINTAIL,

Dafile acuta (Linn.), and possibly

GADWALL,

Anas strepera Linn.

Wâ'-be-kwsiq'-kûh, a White *Kwsiqkûh*, though not necessarily a Sheldrake. (The former is the "Gray Duck" of the gunners at Machias, Maine, where our Indians often go to shoot.)

TEAL

in general, *A'-wâ-tî-wěs'*. Whenever the two species are distinguished they stand thus :

GREEN-WINGED TEAL.

Anas carolinensis Gmel. *Kici-a'-wâ-tî-wěs'*, Big Teal.

BLUE-WINGED TEAL.

Anas discors Linn. *A'-wâ-tî-wěs'-sîs*, Little Teal.

Commonly they are not separated, and the words would mean simply an adult and young teal respectively.

WOOD DUCK.

Aix sponsa (Linn.). *Lûn'-tûg-wi-ěs'*, River or Stream-Bird.

Halântûk, running water, a river; *ěs* is here a generic expression for bird, large or small, or any bird-like animal, such as a bat. It is used only in combination as a terminal, and whenever so found in this list, means "bird."

BUFFLE HEAD.

Charitonetta albeola (Linn.).

So-běg'-wĩ-ěs', Salt-water-Bird ; from *soběhkw*, a body of salt water ; a body of water having a level surface, as opposed to running water (Cf. *sobeyŭ*, smooth).

CANADA GOOSE.

Branta canadensis (Linn.). *Wăp-tūk*.

The word has some reference to the white (*wábeyŭ*) markings about the head and throat. The closest translation obtainable is "the whole thing white."

OLD-WIFE.

Clangula hyemalis (Linn.).

(1) *E'-zĩhks*; also

(2) *Ha'-ha-wěs'*.

The imitation given is "*ha-ha'-wĩk*."

AMERICAN GOLDEN-EYE.

Glaucionetta clangula americana (Bonap.). *Ũm'-kwāl-kwěs'*

BRANT.

Branta bernicla (Linn.). *Măhkw'-la-wi'*.

The imitation of notes is expressed thus : "*măhkw-la'-wi*."

..... (Sp. ?) *Adj'-ĩ-go'-nĩ-ěs'*.

An unidentified "duck."

..... (Sp. ?) *Mũl-djěs'-sĩs*,

Little-mitten. A small, unknown Sea "Duck," sometimes seen on lakes in autumn.

WILSON'S SNIPE.

Gallinago delicata (Ord.). *Něks'-kwi-gwěs'-sĩs*.

Said to mean "Little-Bird-that-hides-in-the-grass," in the sense of creeping under something.

..... (Sp. ?) *A'-wa-wěs'*.

A species of Snipe, confused often with the preceding, and uttering "*a-ha'-wĩk*."

GREATER YELLOW-LEGS.

Totanus melanoleucus (Gmel.). *Dji-zĩs-ko-wěs'*.

Djizĩskoě, jealous or envious.

LEAST SANDPIPER,

Tringa minutilla Vieill., and probably the Semi-palmated Sandpiper,

Ereunetes pusillus (Linn.), *Dji-zis'-ko-wēs'-sīs*, Little "Plover."

SPOTTED SANDPIPER.

Actitis macularia (Linn.). *Nān' ā-mīk'-tūs*.

Rocks-its-rump (*nānāmīs*, a rocking, as of a cradle ; *nānāmīssūk*, rocking chair).

SOLITARY SANDPIPER.

Totanus solitarius (Wils.). *Təuu-təuu-i'-gad-ēs'*.

Long, long-legged Bird (?).

AMERICAN BITTERN.

Botaurus lentiginosus (Montag.). *Nok'-ūm-īn-īs'*; from *nokūmīn*, flour.

It is not "flour," but dandruff that falls from the fluffy feathers of a Bittern when you shake him by his long green legs.

Djīmkwähā is not synonymous with this name.

GREAT BLUE HERON.

Ardea herodias Linn. *Gaskw*.

Compare *Gaskūmīnīs*, Kingfisher. Frequently the Indian says "*Gaskw-mosūms*—Grandfather Crane."

BLACK-CROWNED NIGHT HERON.

Nycticorax nycticorax nævius (Bodd.). *Djim-kwā'-hā*, or *Dji'-mā-kwā'-hā*.

Perfectly distinct, though often confused with *Nokūmīnīs*.

..... (Sp. ?) *Wā'-be-nok'-ūm-īn-īs'*, White-
"Meadow Hen." May be only the adult male Night Heron, which is white when seen from below.

CANADA GROUSE.

Dendragapus canadensis (Linn.). *Sēs-ē-ga'-ti gē-hēs'*.

Meaning given by an Indian, "Bird that picks at the buds (of evergreens) and weeps." It feeds on the soft-wood buds, and the red skin about the eye gives it the appearance of weeping.

RUFFED GROUSE.

Bonasa umbellus togata (Linn.). *Mût'-dji ës'.*

"Lazy-Bird," says one. In the old mythology, *Mûtdjiës* was a wonderful man. He undertook canoe building, but made a failure of it, and has not ventured to try the water since.

PASSENGER PIGEON.

Ectopistes migratorius (Linn.). *Pûl'-ës.*

Ktcikwipûlës is any animal found wild in the woods, *i. e.*, a "wood pigeon."

Biswepûlës is an animal with no owner, a "wild pigeon."

SAW-WHET OWL.

Nyctala acadica (Gmel.). *Kûp-ka' mïs.*

Kûp, pitched in a high key, is the sound uttered by the owl. It is the "whetting" sound that sometimes, as we read, leads travelers, lost at night in the forest, to hunt for the saw-mill and the workmen, who in filing their saws make the sounds that come with such suggestiveness out of the gloom of the lonely woods.

No Indian hunter, if he is sane, thinks of injuring or mocking *Kûpkâmïs*. Nor should any one imitate that diminutive sorcerer, for something about your camp will get a good scorching, and if any one kills him he will as certainly get hurt himself. A pair of moccasins, owned by the writer and blistered before the camp fire, was witness to the truth of this. Had not one of those common mishaps, in which the writer endeavored with success to put the blade of an axe through his foot, occurred *after* instead of before his first tragic encounter with *Kûpkâmïs* (whose pelt was afterwards removed without bewitchment), the evidence would have been conclusive to the Indian. But with all his witchcraft he is a harmless *wohantûsis*, little devil, who would rather prescribe for his small patients, the unwary mouse, and *sîpsis*, small bird, the medicine of magic claws and sharper beak.

LONG-EARED OWL.

Asio wilsonianus (Less.). *Az'l'-gaht*.

Not a widely-known name. A few profess to know this owl, though it breeds regularly on the islands in the St. John River.

GREAT HORNED OWL.

Bubo virginianus (Gmel.). *Tiq-tŭg'l'*, or *Tiq-tŭg'l'*.

Imitation of cry. It is the bugaboo of small children and papooses: "*Tiq-tŭgli! kowolihkw!*—Owl! go to sleep!" the Indian mother says to her child. Equivalent nearly to "Devil git you, go to sleep"

SNOWY OWL.

Nyctea nyctea (Linn.). *Wā'-be-kok'-wo-kūs'*, White Owl.

BARRED OWL.

Syrnium nebulosum (Forst.). *Kok'-wo-kūs'*.

Imitation pronounced in full is "*kok-wŭk-ho-ho*," and doubtless is applied also to the hooting of the Great Horned Owl, which says in English, "Who cooks for you?"

RED-TAILED HAWK,

Buteo borealis (Gmel.),

and all other large Hawks not specifically mentioned, *O-wŭ'-ha*; from *dowŭha*, a very old word, referring to constant search for food.

SHARP-SHINNED HAWK.

Accipiter velox (Wils.). Two names:

(1) *Kä-gèhk'-wŭs*, Little-"Hawk;" from *kägèhkw*, hawk (Penobscot); (Chippeway, *kagek*.) Only the diminutive occurs, but is far more common than the next:

(2) *O'-wŭ'-hah'-sŭs*, Little-"Hen-Hawk."

AMERICAN OSPREY.

Pandion haliaëtus carolinensis (Gmel.). *I'-sō-mā gwēs'*.

Isōmäg'w'n, half a fish. It is said to eat but half of a fish, the middle half (!) and throws away the head and tail. A lazy, good-for-nothing fellow who spends much of his time fishing, is called "*Isōmäg'wēs*—Fish Hawk."

BALD EAGLE.

Haliaetus leucocephalus (Linn.). *Ktci-pül-a'-g'n*.

Related doubtless to *ktcipülakwäg'n*, the tackle with which a pot is suspended over a fire. A withe, having a *kwäg'n*, hook, at one end, is tied by a single knot, *ktcipüleht*, to the support above. The grasp of the Eagle in striking may suggest the apparatus of the camp fire, but one Indian believed that the hooked beak resembled *ktcipülakwäg'n*.

GYR FALCON.

Falco rusticolus gyrfalco (Linn.). *Wâ'-be-wû'-ha*, White Hawk.

KINGFISHER.

Ceryle alcyon (Linn.). *Gäs'-kûm-ûn-îs'*.

Gäskûmkëssû signifies a dropping off suddenly (unexpectedly) beyond one's depth, especially when wading in water. The name doubtless refers to the plunging of the Kingfisher. Often when the first name is spoken another is added: *Näm'-ës-sîs'-kût*, Fisher (*nämëssîs*, a small fish).

Woodpecker in general, and in particular the

DOWNY WOODPECKER.

Dryobates pubescens (Linn.). *A-bak'-wi-sës'*.

"Bird-that-'butts'-its-head," was a meaning given.

BLACK-BACKED THREE-TOED WOODPECKER.

Picoides americanus Brehm. *Mugs-e'-wi-a-bak'-wi-sës'*.

Black-woodpecker, (*mugseweyû*, black); commonly not distinguished by name.

YELLOW-BELLIED SAPSUCKER.

Sphyrapicus varius (Linn.). *Bag'-a-kwä'-hä*.

In the name lurks a reference to the pounding, as in *Abagwisës*.

FLICKER.

Colaptes auratus (Linn.). *Kü'-a'-lohte*.

PILEATED WOODPECKER.

Ceophloeus pileatus (Linn.). *Ûm-kvät'-pöt*.

From *mëhkwätpöt*, red-headed (*mëhkwëik*, red).

WHIPPOORWILL.

Antrostomus vociferus (Wils.). *Hwǽp'-o-lǽs'*.

Mimicry unmistakable.

NIGHT HAWK.

Chordeiles virginianus (Gmel.). *Pǽk'-tǽs-kwǽs'*.

An indelicate though graphic allusion to the peculiar "booming" noise heard at the end of the downward plunge. Related to *pǽktũ*, *pǽktew'n*; also to *Nǽnǽmǽktǽs* (Spotted Sandpiper).

CHIMNEY SWIFT.

Chaetura pelagica (Linn.). *Pǽd-ag'-ǽ-ǽs'*.

Thunder-Bird; from *pǽdagǽk*, thunder. The reason for this name is apparent to all who have heard the muffled beating of wings in the chimney of a country house during the night time. Yet some prefer to think that it refers to the appearance of this Swift in increased numbers before a thunder storm. The swallows occasionally have to bear this name.

RUBY-THROATED HUMMING BIRD.

Trochilus colubris Linn. *A'-la-mũs'-sǽt*.

Probably a reference to the whirring sound in flight.

KINGBIRD.

Tyrannus tyrannus (Linn.). *Mũs'-lǽ-dǽs'*.

Meaning is not clear.

CANADA JAY.

Perisoreus canadensis (Linn.).

It is not strange that the most characteristic, and one of the quaintest and most interesting, birds of the New Brunswick woods should be known by a variety of names, as suits its many-sided nature. The Moose Bird, Gorby, Whiskey Jack, Whiskey John, etc., has scarcely fewer Indian names.

(1) *Mkũn-i'-wa-sǽs'*, Bird-that-picks-out-the-meat (?). Related to *mkũnasũ*, a picking up. One Indian explained that it "picks out the best part of the meat," hence the name. It is more common than the next one:

(2) *Wu'-tci-gan'-i-ēs'*, Bird-of-the-old-camping-place (*wutci-gan*, old camp).

(3) *Kūs'-kūs-se-gwēs'*, Old-Lumberman-Bird (*kūs-kūssegwēsšū*, old lumberman, Penobscot dialect). Like the lumberman, the Canada Jay roams about through the woods as if "cruising" lumber for the coming winter's operations, is the common explanation. Yet there may be a still closer connection between this name and the white man's fancy that the Moosebirds are the restless spirits of old lumbermen, wandering aimlessly through the forest, lingering about the places where they worked long ago.

(4) *Sk'n-a'-gwēs*, Glutton-Bird; from *sk'nägwāt*, a big eater, used often as a term of reproach. This is said to be more current among the Passamaquoddies. "He is eatin' all the time; seem like he never git enough," says an Indian.

RAVEN.

Corvus corax sinuatus (Wagl.). *Ktcī' ā ga-gah'*, Big Crow.

Observe that a Common Crow of larger size than usual would be called *ktciägagagos*.

BLUE JAY.

Cyanocitta cristata (Linn.). *Ti'-ti-ās'*.

Perhaps *titi* is imitative.

BOBOLINK.

Dolichonyx oryzivorus (Linn.). *Sau'-ni-djäg-wül'-ūskw*.

One Indian thought it meant a "half-breed" blackbird. But perhaps it is related to *sauūnūs'n*, the south wind.

CROW.

Corvus americanus Aud. *Ga-ga'-gos*. Mimicry.

BRONZED GRACKLE.

Quiscalus quiscula æneus (Ridgw.). *Djäg-wül'-ūskw*, or *Djäg'-wü-lī'*.

Imitation. A name for blackbirds in general. Same as "*Chog luskw*," Blackbird, in old Abenaki language (Kidder).

RED-WINGED BLACK BIRD.

Agelaius phoeniceus (Linn.). *Měhk'-wūl-kwīn'-ūt.*

Měkwūlinūt, red wing, from *wūlin*, wing, and *měkweĭk*, red.

PINE GROSBEAK.

Pinicola enucleator (Linn.). *A'-mūn-ha'-dūk.*

Some reference to striking at the birds with the bill. At sight, both the Crossbills and the Purple Finch are likely to receive this name.

RED CROSSBILL,

Loxia curvirostra minor (Brehm), and

WHITE-WINGED CROSSBILL,

Loxia leucoptera Gmel.

- (1) *A'-mūn-ha'-dūk*. Occasionally also
- (2) *Pim-skwā'-bēk-hig'n'-īs*, "Cross-Bill."

RED POLL,

Acanthis linaria (Linn.), and

PINE SISKIN,

Spinus pinus (Wils.). *Kwsi' ā-wīs'*, or *Kwsi'-wīs'*.

Imitation of notes, having no reference to the meaning of the word, *kwsīāwīsk*, a virgin.

PURPLE FINCH.

Carpodacus purpureus (Gmel.). *Měhk-we-ūt*, from *měhkweĭk*, red.

The full name is *Měhk-we'-ūt-bon-ī-ēs'-sīs*, Little-Red-Winter-Bird (*pūbon*, winter). This name is only given to the males, and is barely applicable, for the Purple Finch is only exceptionally a winter bird.

SNOWFLAKE.

Plectrophenax nivalis (Linn.).

(1) *Wā'-bi-gēl-lāk'-sīs*, Little-Goose (domestic variety). There are not many Indians living to-day who remember the old name, so thoroughly has it been supplanted by the new. Partly by accident the writer discovered the older

(2) *Psan'-ī-ēs'*, Snowing Bird, from *psan*, snowing.

THE SPARROWS.

What a multitude of small, plain-colored birds the term "graybird" embraces, as used by the average white man in the Maritime Provinces of Canada. While we find that the average Indian there is a closer observer of birds than his white neighbor, we should not be surprised at his confusion when asked to give distinctive names to the different members of the Sparrow family. The truth is, they are more familiar with the names of these sparrows than with the appearance of the particular species to which they refer. They clearly recognize differences in songs, and they have names, based on these or other peculiarities, that are generally well chosen. Yet at first sight an Indian will call any sparrow *Glaksis* or *Sûlsûlsili*, because, as he tells you, "they all look alike."

SAVANNA SPARROW.

Ammodramus sandwichensis savanna (Wils.). *Sûl-sûl-sûl'-i*.

A likely imitation of the little meadow bird's song, but it has more interest in connection with the Song Sparrow.

THISTLE BIRD (American Goldfinch).

Spinus tristis (Linn.). *Wi-zau'-î. ës'-sîs.*

Little-Yellow-Bird ; from *wizaueyû*, yellow.

SONG SPARROW,

Melospiza fasciata (Gmel.), and all sparrows in general.

(1) *Sûl-sûl-sûl'-i*. Imitation. This is one of the most constant singers. While to an unusual degree each individual renders his song to suit himself, there is throughout endless variety so strong a common resemblance that the author can never be mistaken. One type of song is strikingly suggested by the following string of jargon as given by an Indian boy: "*Sûl-sûl-s'l-i+*", *sû'-gas-kût'-pe-mo'-sûm-s'n*—Sulsulsili, our flat-headed grandfather."

(2) *Ka-gäs'-g'l-djës'-sîs*, a name given also to *Kiqkanîës*.

WHITE-THROATED SPARROW.

Zonotrichia albicollis (Gmel.). *Klak'-sīs*, Little-Clock.

The Indians say that *Klaksīs* whistles every hour during the night, hence the name. They never tire of imitating the song of the Little-Clock, and one of the favorite interpretations is as follows: "*Ma-l-zis'-kwētc*, *säg'-il-īt*, *säg'-il-īt*, *säg'-il-īt*—Milicete Squaw,

"✱"

Again, in good Milicete, it says, "*Ma-li'-skūs*, *däg'-ä-dûk'*, *däg'-ä-dûk'*, *däg'-ä-dûk'*—Molly Brass Kettle, slap it, slap it, slap it."

At another time it may be, "*Ma-li'-skūs*, *kil'-o-lit*, *kil'-o-lit*, *kil'-o-lit*—Molly Brass Kettle, speak to me," etc. The Penobscot name (auct. Mr. John N. Drake) is *Wâbepepē*. Also, the Passamaquoddies call it *Wâbepe*. Imitations, both.

CHIPPING SPARROW.

Spizella socialis (Wils.). *Kiq ka' n-ēs'*, Garden or Field-Bird.

SLATE-COLORED JUNCO.

Junco hyemalis (Linn.). *Pok'-wi-snau'-i-ēs'*.

SWALLOWS,

all species, including the

MARTIN,

Progne subis (Linn.), *He-bīs'-kū-tēs'*.

CEDAR WAX-WING.

Ampelis cedrorum (Vieill.). *Meg wi'-mo-si-māk'-sīt*.

"Cuts its hair" (*mosimoi*), long behind and short in front, like the Mohawks and others, is the meaning given.

* Though constantly quoted by Milicetes, the language is Micmac, which they do not understand. The writer learned the story from a Micmac Indian in Nova Scotia: A long time ago a Micmac brought home as his wife a squaw from the tribe of Milicetes, which the others did not approve of at all, for the two tribes had been at enmity. Every occasion was taken to insult the woman. One day a White-throat happened to be singing near by, and as if in imitation, an Indian repeated the words given above, which were meant to give offence. The word sounds like *tei-gil-az'-i*—go away (Micmac), but it is not.

OVEN BIRD.

Seiurus aurocapillus (Linn.). *Sag'-i-b'g'nūk'-ēs.*

Bird-that-comes-when-the-buds-open (?).

AMERICAN REDSTART,

Setophaga ruticilla (Linn.),

or any very small bright bird, *Skwūd'-ēs*, Fire Bird (*skwūt*, fire).

CATBIRD.

Galeoscoptes carolinensis (Linn.). *Pso-īs'-wī-sip'-sīs*, Cat Bird.

This name certainly did not exist until the whites brought such an animal as *psois* into the Milicete country, but the old name, whatever it was, could not be learned.

WINTER WREN.

Troglodytes hiemalis Vieill.

(1) *A'-lūm-sūb-i-kēh'-sīs.*

(2) *Ha-mu'-sūb-i-kēh'-sīs*, Little-Spider-Bird (*hamu-sūbēhkwo*, a spider). A doubtful name, mistaken for the first one.

(3) *Wai-nok'-tcīs*, Little-White-Man. This name originated soon after the first settlement by the white people. A certain boy then used to whistle like the Winter Wren; so it came about whenever the song of *Alūmsūbi-kēhsīs* was heard the Indians used to say "Wainoktcīs, the Little-White-Man."

BROWN CREEPER,

Certhia familiaris americana (Bonap.),

or any other bird that resembles it in appearance or habits, such as either of the Nuthatches and the Black-and-White Creeper, *Wūl-gēs'-kwīs*, Little-Bark (*wūlīgēskw*, outside bark), a significant name.

RED-BREASTED NUTHATCH,

Sitta canadensis Linn.,

and perhaps the White-breasted Nuthatch,

Sitta carolinensis Lath.

(1) *Ba'-tīl-i-az'-īs*, Little-Priest; from *batīliās*, a

corruption of the French *patriarche*. This is of course a new name, which has nearly supplanted the older

(2) *Tci'-di-wa'-ti-wèmp'-tos*. The word *tcidiwatiwè* signifies a slow going downwards on a tree trunk.

BLACK-CAPPED CHICKADEE,

Parus atricapillus (Linn.), and

HUDSONIAN CHICKADEE,

Parus hudsonicus Forst. *Tci-gi'-gi-lüh'-sës*.

Imitation ("tcigigi"). Passamaquoddy, *k'tci-gi-gi'-las* ("kitchigegelas"). Concerning the double note frequently uttered by the Black-cap, with a plaintive rising and falling inflection, Noel Sapier reverently assured the writer that the leader of a little flock uttered those words, and that he was saying to them "*Ze-zos*," Jesus.

HERMIT THRUSH,

Turdus aonalaschkæ pallasii (Cab.), and incidentally the

OLIVE-BACKED THRUSH,

Turdus ustulatus swainsonii (Cab.), and

WILSON'S THRUSH,

Turdus fuscesens Steph.

(1) *A'-täl-a-wauk'-tum*, rarely *A'-täl-a-gwauk'-tum*. Possibly an imitation of song—at least no meaning could be learned.

(2) *Ta-ne'-li-ain'*, Where are you going? Now properly a name.

"*Ta-ne'-li-ain'*, *Ni-kwöl'-o-wäs'-sët*? Where are you going, *Nikwölowlwässët*?" asks *Atälawauktum*. Out of the chilly mists of the early morning and in the deepening shadows of twilight we hear him, perched on the topmost cone of a tall spruce, high above his nest and sitting mate, repeating this question. Again, with matchless pathos, "*Ta-ne'-li-ain'*, *Ni-ko'-la Dën'-i-Dën'-i*?—Where are you going, Nicolas Denys?" Inquiry reveals the fact that

Nicolas Denys is only an Indian. Yet the Indian has forgotten that his ancestors once traded with a white man of that name.*

AMERICAN ROBIN.

Merula migratoria (Linn.).

(1) *Um-kwib'-i-si-hēs'*, Red-throated (?) Bird. A new name unquestionably. The other is

(2) *Tçi'-la-tci'-h*, an imitation of the cheerful, cheery *tci-la'-tci-li'*. Only the older generation recognize this name, and in a short time it will be forgotten.

In conclusion :

The male bird is *nau-bŭ'-ha*.

The hen bird is *skw'hēs* (squaw bird).

The nest is *mu'-ci-sēs'-sīs* (little bird's camp?).

Egg, *Wá'-wăn*.

The following is an imperfect list of Mammals known to the Milicete Indians.

VARYING HARE, "Rabbit."

Lepus americanus. *Mah' ti-gwēs'*.

PORCUPINE.

Erethizon dorsatus. *Ma'-di wēs'*.

MUSKRAT, "Musquash."

Fiber zibethicus. *Ki'-wo-hūs'*.

BEAVER, "Beaber."

Castor fiber canadensis. *Kwa'-bit*.

GROUND HOG.

Arctomys monax. *Mon'-im-kwēs'*.

CHIPMUNK, "Ground Squirrel."

Tamias striatus. *Ha'-sa-kŭ-ŭk'*.

* Monsieur Denys came to America in 1632. In 1636 he became Governor of the whole extent of the Bay of St. Lawrence and founded two settlements, which were also trading posts. There the Milicetes went to trade, so that his name must have been well known to them. Thus has the name been handed down from that remote time.

RED SQUIRREL.

Sciurus hudsonius. *Mi'-k'ōh.**The squirrel, par excellence, of these Indians.*

FLYING SQUIRREL.

Sciuropterus volucella. *Seks-ka'-tū.*BAT, any species. *Mōn-deg'n'-i-ēs'.*

In this name is a curious play upon words that would not be treated seriously except that it has entirely supplanted any other name. It is of recent origin. Bats, of course, are regarded as "birds."

MOOSE.

Alces americanus. *Mo + s.*

Believed to be a sort of imitation.

VIRGINIA DEER.

Cariacus virginianus. *Ēd-ok'.*

CARIBOU.

Rangifer caribou. *Mēg-al'-īp.*

Means "it shovels away the snow."

BLACK BEAR.

Ursus americanus. "Bar," *Mu'-in.*

OTTER.

Lutra canadensis. *Ki'-wōn-ik'.*

The *kīl-he'-g'n* is a sort of dead-fall built across the slide of an otter, with triggers so arranged that the trap is sprung as the animal passes through.

SKUNK.

Mephitis mephitis. *A'-bīg tci'-lū.*

Refers undoubtedly to the characteristic odor.

MINK.

Putorius vison. *Tci'-a-gēs'.*

WEASEL.

Putorius ermineus. *Sī gwēs'.*In winter pelage, *Wā'-bi-sī-gwēs'*, White-Weasel.

FISHER.

Mustela pennanti. "Black Cat," *Pa-gūmpk'.*

AMERICAN SABLE.

Mustela americana. "Saple," *Ne-makw'-so-ēs'*.

Sable trap, *ne-makw'-so-ēs'-wī-heg'n'*. These traps are dead-falls, built in almost any conceivable situation—upon stumps, against sides of trees, on logs, on the ground. The setting is not by the "figure 4," but by a "standard" and a "bait-stick."

Stretchers for stretching the skins of sable, also of mink, *t'kōb'l-ha-wag'n'*.

RED FOX.

Vulpes fulvus. *Kwauk'.sīs.*

Probably refers to the "tail" (*alauksīs*).

WOLF.

Canis lupus. *Mal'-sum.*

LYNX.

Lynx canadensis. "Lusifi," *A'-bi-gwī-si'-g'n.*

DOMESTIC ANIMALS:

DOG.

Canis familiaris. *Ūl'-i-mus'.*

The following are some of the individual names: *Kokwokūs* (Screech Owl); *Skinōsīs* (Boy); *Muin* (Bear); *Tûmaskw* (Nigger).

CAT.

Felis catus. *Pso'-īs.*

COW.

Bos taurus. *Ca-hus'.*

Notice that the English plural serves for the singular. Cows, *Ca-hus'-ŭk.*

HORSE.

Equus caballus. *A-has'.*

English word.

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1893-94.

No. 6.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

For the Year Ending March 27, 1894,

WITH

RECENT PROGRESS IN THE STUDY OF
NORTH AMERICAN MAMMALS,

By J. A. ALLEN,

AND

A CONSIDERATION OF SOME ORNITHOLOGICAL
LITERATURE, WITH EXTRACTS FROM
CURRENT CRITICISM,

I., 1876 to 1883,

By L. S. FOSTER.

*The Society meets on the second and fourth Tuesday
evenings of each month at the American Museum of Natural
History, Central Park, New York City.*

PUBLICATIONS
OF
The Linnæan Society of New York.

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TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPIECE—PORTRAIT OF LINNÆUS.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTH-EASTERN NEW YORK. By CLINTON HART MERRIAM, M.D.

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IS NOT THE FISH CROW (*Corvus ossifragus* Wilson) A WINTER AS WELL AS A SUMMER RESIDENT AT THE NORTHERN LIMIT OF ITS RANGE? By WILLIAM DUTCHER.

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FOR THE YEAR ENDING MARCH 27, 1894.

This is the sixth in the series of "Abstracts" published by the Society, and, like the preceding numbers, is intended mainly as a brief review of the year's work, only the more important points in the papers read before the Society being mentioned. Some of the papers have been printed in full elsewhere, and in such cases a reference is given to the place of publication.

March 15, 1893.—Mr. L. S. Foster in the chair. Twelve members and four visitors present.

The Auditing Committee reported that it had examined the Treasurer's report and found it correct.

Mr. A. H. Howell read a paper entitled "Remarks upon Birds observed on Long Island, N. Y., during 1892." It treated of the author's collecting experiences at various points on the island from January to October. He recorded, among other things, the capture of an Orange-crowned Warbler (*Helminthophila celata*), at Flatbush, on October 12, 1892. [See "Auk," Vol. x., 1893, p. 90]

Mr. William Dutcher spoke of a specimen of the Orange-

crowned Warbler (*Helminthophila celata*), now in the collection of the Long Island Historical Society, taken many years ago in Brooklyn. [See "Auk," Vol. x., 1893, p. 277.]

A discussion of the nesting habits of the Crested Flycatcher (*Myiarchus crinitus*) disclosed the fact that many nests of this species lack the usually-expected snake-skin.

Mr. H. W. Floyd recorded the capture of two specimens of the Lapland Longspur (*Calcarius lapponicus*) at Rockaway Beach, Long Island, on February 22, 1893.

April 5, 1893.—The President in the chair. Ten members and thirteen visitors present.

Louis B. Bishop, M. D., presented a paper entitled "Change of Color in the Plumage of the Kestrel (*Tinnunculus alaudarius*)."
Dr. Bishop's paper was based upon a series of skins collected by himself in Egypt, during the winter of 1890-91; this series embraced various stages of plumage from the rufous of the young to the slate-gray of the adult bird. He considered that the bird changed from immature to adult plumage principally without a moult. Dr. J. A. Allen considered that Dr. Bishop's theory did not seem to be substantiated by the facts, and stated that continuous observations of living birds were necessary to a proper understanding of the case.

C. S. Allen, M. D., gave a practical illustration of the manner of safely handling poisonous snakes. He exhibited living specimens of the Florida Diamond-backed Rattlesnake (*Crotalus horridus*) and the Moccasin (*Ancistrodon contortrix*), and showed the effect of the poison upon two Guinea Pigs.

April 19, 1893.—The President in the chair. Seven members and two visitors present.

J. A. Allen, Ph. D., presented a paper entitled "Protective Coloration and Mimicry," which was a review of various theories of these subjects. Dr. Allen held that protective coloration is largely due to environment.

May 3, 1893.—No quorum present.

May 17, 1893.—The President in the chair. Six members and two visitors present.

Mr. William Dutcher read a paper entitled "Notes on Some Rare Birds in the Collection of the Long Island Historical Society." [See "Auk," Vol. x., 1893, pp. 267-277.] Mr. Dutcher also mentioned recent captures on Long Island of the Black-throated Loon (*Urinator arcticus*), Wood Ibis (*Tantalus loculator*), and Yellow-crowned Night Heron (*Nycticorax violaceus*). [See "Auk," Vol. x., 1893, pp. 265, 266.]

Mr. A. H. Howell said that he had taken on Long Island this season a male Golden-winged Warbler (*Helminthophila chrysoptera*) and a female Hooded Warbler (*Sylvania mitrata*).

Dr. J. A. Allen made some remarks upon the Motmots, illustrated with specimens. He considered that the series of skins of these birds in the American Museum of Natural History shows quite plainly that the peculiar trimming of the tail-feathers is effected by the bird itself.

Mr. W. W. Granger stated that he had noticed that, for the past two years, two pair of Duck Hawks (*Falco peregrinus anatum*) had bred on the Palisades of the Hudson River. Opposite Yonkers a nest with eggs had been observed by him, a subsequent visit to which revealed the fact that the young had been hatched and, doubtless, removed by the parents.

June 7, 1893.—The President in the chair. Eight members and seventeen visitors present.

Mr. L. S. Foster, as chairman of the Finance Committee, reported two donations to the treasury of the Society—one of five dollars from Mr. Henry G. Marquand and one of fifty dollars from Miss Phœbe Anna Thorne.

Mr. F. M. Chapman presented extended remarks upon his recent trip to the Island of Trinidad, illustrated by photographs and numerous specimens of birds, mammals, and reptiles which he had collected there. He said that, faunally, Trinidad has no connection whatever with the West

Indies, but is, both faunally and geologically, related to South America, of which it was undoubtedly once a part. Mr. Chapman passed the greater part of his time at the Indian Walk Rest-house, seven miles southwest of Princetown ; and he also visited San Fernando, La Brea, Moruga, the Caroni River, and Monos and Huevos Islands. He described his experience on Huevos Island in the cave which is inhabited by about two hundred Guácheros (*Steatornis caripensis*.) [See "Bull. Am. Mus. Nat. Hist.," Vol. v., pp. 203-234, and Vol. vi., pp. 1-86.]

C. S. Allen, M. D., exhibited an egg of the Canada Goose (*Branta canadensis*) of unusually large size, inside of which was a smaller egg perfectly formed and which had contained two yolks. The outer egg contained one.

June 21, 1893.—The President in the chair. Seven members and two visitors present.

J. A. Allen, Ph. D., presented remarks upon the White-footed Mice of North America, exhibiting specimens of nearly every known form of the genus *Sitomys* (formerly *Hesperomys*). Mr. Chapman spoke of the Florida forms—*Sitomys niveiventris* and *S. gossypinus*.

Mr. F. M. Chapman read a paper entitled "Birds Observed on a Voyage to Trinidad." In the course of the paper, he described the migrations which take place in the West Indian Islands and on the northern coast of South America. He said that apparently the greater number of North American birds reach Trinidad by way of the Antilles. On the return voyage many Petrels were seen, over one hundred individuals having been observed on May 16 and 17. These birds parted company with the vessel, when a cold wave set in, off the southern coast of Delaware. Man's influence upon the distribution of birds was brought to mind by the appearance of a Black Finch (*Volatinia jacarini splendens*) upon the vessel when off Trinidad ; the bird remained on board until Grenada was reached, when it flew ashore. A Black-poll Warbler (*Dendroica striata*) was seen near the vessel when two hundred and fifty miles from the nearest land.

Mr. L. S. Foster read a list of antidotes, chiefly plants, which were considered to be useful in treating the bites of poisonous snakes.

Mr. S. H. Chubb reported the breeding of the European Starling (*Sturnus vulgaris*) in a church tower at Lenox avenue and 123d street, New York City. He had seen several young birds.

Mr. W. W. Granger stated that two nests, containing nearly-fledged young of this species, are at present on the American Museum building. These birds have been continually present in Manhattan Square since the fall of 1891, with the exception of January and February, 1893.

October 4, 1893.—The President in the chair. Nine members and seven visitors present.

The Constitution was so amended that Resident Members may become Life Members upon the payment to the Treasurer of fifty dollars, which shall be in lieu of annual dues; and that any person interested in the aims of the Society may become a Patron upon the payment to the Treasurer of five hundred dollars and its acceptance by the Society.

Mr. L. M. Loomis presented a paper entitled "A Study of the Earlier Southward Migrations at Monterey Bay, California, during June, July, and August, 1892." He found that the migration commenced on the Pacific coast in the same manner as in the East—by the departure, first, of the adult birds breeding in the vicinity, followed later by those from further north. The Northern Phalaropes (*Phalaropus lobatus*) were very abundant, especially on August 12. Usually they were found to migrate several miles from shore, but on that day they were deflected by a dense fog to within five hundred yards of the coast line.

Mr. L. S. Foster read a paper entitled "A Consideration of Some Ornithological Literature, with Extracts from Current Criticism. I. 1876 to 1883." The criticisms in this paper were taken from the eight volumes of the Bulletin of the Nuttall Ornithological Club, and the subject was

treated from numerous standpoints. [This paper appears in this Abstract.]

October 18, 1893.—The President in the chair. Ten members and three visitors present.

An amendment to the By-Laws was passed, changing the nights of meeting to the second and fourth Tuesdays of each month.

A committee was appointed to draft resolutions upon the recent death of our fellow-member, Charles Slover Allen, M. D.

Mr. F. M. Chapman presented a paper entitled "The Origin of Certain North American Birds as Determined by their Routes of Migration." He said that the summer visitant birds of our country might be divided into two classes, viz.: (1) Those which breed continuously from our southern border to the northern limit of their range and (2) those species in which there is a large area between the southern limit of their breeding range and our southern border. Of the first class Mr. Chapman mentioned the Gray Kingbird (*Tyrannus dominicensis*), Black-whiskered Vireo (*Vireo calidris*), Parula Warbler (*Compsothlypis americana*), and Pine Warbler (*Dendroica vigorsii*). These may be considered to have reached their present limits by a gradual northward extension of their range, in which two causes have had part—(1) absence of competition and (2) abundance of food. As an example of the second class Mr. Chapman chose the Bobolink (*Dolichonyx oryzivorus*), a bird which breeds from New Jersey to Nova Scotia, westward to Utah, and northward to the southern border of the British Territories. It is worthy of note that the Bobolinks which nest west of the Rocky Mountains do not migrate southward with the birds of the Western Province, but retrace their steps and leave the United States by way of Florida, thus furnishing evidence of gradual extension of range westward and of the stability of routes of migration.

J. A. Allen, Ph. D., read a paper entitled "The Migration

of Birds," giving a summary of our present knowledge of the subject.

Mr. A. H. Howell spoke of a young Baltimore Oriole (*Icterus galbula*) which was strangled in the nest by a hair becoming tightly wound about its neck.

November 14, 1893.—The Vice-President in the chair. Nine members and nine visitors present.

The committee appointed to draft resolutions upon the death of Dr. C. S. Allen reported as follows :

"Charles Slover Allen, M. D., a resident member of the Linnæan Society, died in this city on October 15, 1893, after a brief illness.

"Dr. Allen was born at New Berne, North Carolina, in 1855. He graduated from Columbia College, New York City, winning first prize in chemistry in competitive examination. After leaving college, he studied medicine under Dr. James B. Wood, and obtained his degree of Doctor of Medicine from Bellevue Hospital College. As the result of a competitive examination in which he took the highest rank, he was appointed an interne in the Charity Hospital on Blackwell's Island.

"At the completion of his term of service in this institution, he went abroad and continued his studies at Heidelberg.

"On returning to New York City, he was associated with Dr. James B. Wood, and later established an office of his own at 21 East 28th Street, which he occupied at the time of his death.

"In the treatment of throat, nose and ear affections, Dr. Allen was especially and notably skillful, and he held the position of clinical lecturer on these diseases in the medical department of the University of the City of New York.

"Dr. Allen was born a naturalist, and only the duties of an unusually active professional life prevented him from taking high rank as an original investigator in some branch of natural history. As a naturalist, his tastes were of the broadest. Every object in nature had for him a fascina-

tion which impelled him to study the animate or inanimate with equal ardor.

"He was an exceedingly close observer, of unlimited patience. At an early period he began the study of birds, and his papers on the Fish Hawk (*The Auk*, ix, 1892, pp. 313-321, pll. iv, v) and the Black Duck (*Ibid.* x, 1893, pp. 53-59, pll. i, ii) gave evidence of the excellent use he made of his necessarily limited opportunities for field work.

"More recently, his natural history work had been largely confined to investigations of the toxic power of snake-venom, with the particular object of discovering an antidote for this virile poison. Dr. Allen was gifted with much ingenuity in the mechanical details of his profession, and the methods he employed in his herpetological studies were far in advance of any which had been previously used. While his experiments had not permitted him to arrive at final conclusions concerning the treatment of snake-bite, he had nevertheless brought together a large amount of invaluable data, which, it is to be regretted, will now never see the light.

"On several occasions during the past two years, he treated, with success, persons who had been bitten by venomous snakes—moccasins and rattlesnakes—and he also had one patient who had been seriously bitten by a Gila monster.

"In the absence of a specific antidote, Dr. Allen's method of treatment was to isolate the poison by injections about the wound which would coagulate the fluids, and then remove the poisoned part. As a result of his experiments with the Gila monster, Dr. Allen discovered that the bite of this reptile is not poisonous, provided it can be made to release its hold at once, for he observed that the poison does not begin to flow until the animal has been attached to its victim for several seconds.

"Dr. Allen was a rarely genial comrade. In the field, no misfortune was so great as to dampen his enthusiasm, and his generous disposition always prompted him to sac-

rifice himself for the good of his companions. Indeed, his presence on an expedition was an assurance that it would be both a pleasant and a successful one.

"Dr. Allen was elected a member of this Society in 1878, at its second meeting, and has always taken an active part in its proceedings, serving as Treasurer from 1889 to 1890. The results of his natural history researches were always presented before the Society, and his interest and attainments in every branch of science permitted him to discuss almost any subject which has come before us

"We feel, therefore, that in Dr. Allen's death, the Society has parted with a member it could ill afford to lose, and as your Committee we know that we are voicing the sentiments of the Society, when we express our sincere grief at the death of one who ever had the best interests of the Society at heart.

"FRANK M. CHAPMAN,

"FRANK E. JOHNSON,

"ARTHUR H. HOWELL,

"Committee."

Mr. L. M. Loomis presented a paper entitled "Variability in the Occurrence of Transient Migrants." [See "Auk," Vol. xi., 1894, pp. 26-33.]

Mr. Loomis also read a paper entitled "Facts Concerning Migration in the Southern Hemisphere, Gleaned from Sclater and Hudson's 'Argentine Ornithology.'" The observations recorded in this work reveal that the same causes of migration exist in temperate South America as in temperate North America, and that similar movements take place in both regions. The height of the movement toward the equator occurs in Argentina during February and extends through March and into April. The migration to the breeding-grounds in the direction of the South Pole takes place chiefly in August, September, and October. In addition to the migration of endemic species, there is a migration thither of birds breeding in North America.

The following species are characteristic exemplifications of this migration: American Golden Plover (*Charadrius dominicus*), Wilson's Phalarope (*Phalaropus tricolor*), Pectoral Sandpiper (*Tringa maculata*), White-rumped Sandpiper (*Tringa fuscicollis*), Sanderling (*Calidris arenaria*), Solitary Sandpiper (*Totanus solitarius*), Bartramian Sandpiper (*Bartramia longicauda*), Buff-breasted Sandpiper (*Tryngites subruficollis*), and Eskimo Curlew (*Numenius borealis*). The Greater Yellow-legs (*Totanus melanoleucus*), Yellow-legs (*Totanus flavipes*), and Hudsonian Godwit (*Limosa hæmastica*) present peculiar conditions, for these birds occur in summer as well as in winter, strongly suggesting a double migration—one from boreal breeding-grounds and one from austral breeding grounds—the two migrating bodies meeting in Argentina.

Mr. F. M. Chapman read a paper entitled "The Islands the Alligators Build," being a popular account of the formation of the small islands in some of our southern waters. [See "Our Animal Friends," Vol. xxi, May, 1894, pp. 198-202.]

November 28, 1893.—The Vice-President in the chair. Nine members and twelve visitors present.

Mr. L. S. Foster presented a paper entitled "A Consideration of Some Ornithological Literature, with Extracts from Current Criticism. II. 1884 to 1893." [This paper appears in this Abstract.]

Mr. A. H. Howell read a paper entitled "Birds in our Great Cities," being a list with annotations of fifty-six species observed in the thickly-settled portions of New York City and Brooklyn; records from Central and Prospect Parks were omitted.

December 12, 1893.—The Vice-President in the chair. Twelve members and five visitors present.

Louis B. Bishop, M. D., read a paper on "The Breeding of Brewster's Warbler (*Helminthophila leucobronchialis*)."

[See "Auk," Vol. xi., 1894, pp. 79-80.]

Mr. Chapman commented on Dr. Bishop's paper, and

exhibited a number of skins of this species from the collection of the American Museum. He also related his experience with this bird in New Jersey and showed a nest which he had taken there.

Mr. F. M. Chapman presented a paper entitled "Remarks on West Indian Mammals." After comparing the mammalian life of "oceanic islands" and "continental islands," and speaking in some detail of the mammals of the West Indies, he described his experience in collecting Bats and Hutias in Cuba.

Mr. C. B. Riker stated that the Mongoose is now decreasing in numbers in Jamaica.

Dr. Bishop related his experiences while hunting Bats in Egyptian tombs.

Mr. A. H. Howell read some notes on Long Island birds. [See "Auk," Vol. xi., 1894, pp. 82-84.]

Mr. A. H. Helme stated that he had seen the Yellow-bellied Flycatcher (*Empidonax flaviventris*) and the Golden-winged Warbler (*Helminthophila chrysoptera*) frequently at Millers Place, Long Island, and had taken there, the past fall, an Orange-crowned Warbler (*Helminthophila celata*) and several Tennessee Warblers (*Helminthophila peregrina*). Dr. Bishop remarked that a Whistling Swan (*Olor columbianus*) had been taken early in November of this year at Guilford, Connecticut, and that a flight of Black Terns (*Hydrochelidon nigra surinamensis*) had been observed at the Quinnipiack Marshes, Connecticut, on August 29, 1893. [See "Auk," Vol. xi., 1894, p. 74.]

December 26, 1893.—The President in the chair. Thirteen members and twenty-seven visitors present.

The Lecture Committee presented a formal report through Dr. J. A. Allen, the chairman, stating that arrangements had been completed for a course of four lectures to be given in the lecture hall of the American Museum as follows:

1. January 9, 1894. "A Naturalist in the Island of Trinidad," by Frank M. Chapman.

2. February 13, 1894. "Oyster Culture in Europe," by Bashford Dean, Ph.D.

3. March 6, 1894. "Mammals of the Ancient Lake Basins of North America," by Henry Fairfield Osborn, Sc. D.

4. April 3, 1894. "Domestic Fowls and Pigeons," by Daniel G. Elliot, F. R. S. E.

Mrs. Olive Thorne Miller presented a paper entitled "A Rocky Mountain Study," telling of some of her ornithological experiences in the vicinity of the Great Salt Lake, Utah. [See "Atlantic Monthly," February, 1894, pp. 198-206.]

Mr. B. H. Dutcher read a paper on the fauna of Montauk Point, Long Island, giving the results of his observations made during September, 1893. Seventy-seven species of birds and the following mammals were observed;—Meadow Mouse (*Arvicola riparius*), Jumping Mouse (*Zapus hudsonicus*), White-footed Mouse (*Sitomys americanus*), Musk-rat (*Fiber zibethicus*), Wood Hare (*Lepus sylvaticus*), Opossum (*Didelphis virginianus*), Raccoon (*Procyon lotor*), Mink (*Lutreola vison*), Skunk (*Mephitis mephitis*), Fox (*Vulpes fulvus*), Brown Rat (*Mus decumanus*), and three species of Shrew.

Mr. F. M. Chapman presented an analytical summary of the bird-life of the vicinity of New York City, where he has recorded three hundred and fifty-one species.

January 9, 1894.—Public lecture in the lecture hall of the American Museum of Natural History by Mr. Frank M. Chapman, entitled "A Naturalist in the Island of Trinidad," with stereopticon illustrations.

January 23, 1894.—The Vice-President in the chair. Ten members and sixteen visitors present.

Mr. L. M. Loomis presented the two following papers: (1) "On the Causes that Necessitate Bird Migration" [see "Auk," Vol. xi., 1894, pp. 94-117]; and (2) "On the Views held concerning the Migration of Young Birds of the Year."

Mr. C. B. Riker read a paper entitled "Experiences during Collecting Trips on the Amazon River." With Santarem as a base, he made excursions thence into the virgin forests of the surrounding country. He found little true bird-music, but the birds fell naturally into the following surprising classes: "screechers," "whistlers," "grunters," and "chirpers."

Mr. F. M. Chapman reported that a Hermit Thrush (*Turdus aonalaschkæ pallasii*) and a Towhee (*Pipilo erythrophthalmus*) had thus far spent the winter in Central Park, and that a Baltimore Oriole (*Icterus galbula*) had been seen several times recently about the American Museum building.

Mr. C. C. Young said that a Bonaparte's Gull (*Larus philadelphia*) had been captured at Rockaway Beach in January of this year.

February 13, 1894.—Public lecture in the lecture hall of the American Museum of Natural History by Bashford Dean, Ph. D., on "Oyster Culture in Europe," with stereopticon illustrations.

February 27, 1894.—Mr. E. T. Adney in the chair. Eight members and three visitors present.

The paper presented at this meeting was by J. A. Allen, Ph. D., entitled "Recent Progress in the Study of North American Mammalogy." In his absence, on account of illness, it was read by the Secretary. [Printed in full in this Abstract.]

March 6, 1894.—Public lecture in the lecture hall of the American Museum of Natural History on "Mammals of the Ancient Lake Basins of North America." The lecture was given by J. L. Wortman, M. D., in place of Professor H. F. Osborn, who was unexpectedly prevented from giving the lecture, as had been originally arranged. The lecture was abundantly illustrated with maps, charts, and stereopticon views.

March 27, 1894.—Annual Meeting. The President in the chair. Ten members and seven visitors present.

The Secretary presented his annual report as follows :

"There have been held during the year 15 meetings, being the same number as last year ; on May 3—a very stormy night—no meeting was held, through failure to secure a quorum.

"The average attendance of members was 9, and of visitors 8. The total number of persons in attendance was 254, of whom 122 were visitors, and 132 members.

"The largest number of members present at any meeting was 13, the smallest number 6 ; largest number of visitors present, 27 ; largest attendance of both members and visitors, 40 ; smallest total attendance, 7, which occurred but once. The attendance of visitors shows an increase over last year of 72 per cent. and the total attendance an increase of 24 per cent.

"There were on the roll at the commencement of the year 77 members, consisting of Honorary, 3 ; Resident, 37 ; and Corresponding, 37.

"One hundred and eight Resident members have been added to the roll, while 4 have died, 4 have been dropped, and one transferred to Corresponding membership, leaving the total of Resident members 136. One Corresponding member has died, and one has been transferred to Resident membership, leaving the total of Corresponding members 35, and the grand total 174.

"The members lost by death during the year are Charles Slover Allen, Jenness Richardson, Alexander I. Cotheal, Paul Hoffman, and B. F. Goss.

"There have been read before the Society 29 papers, 22 by the Resident members, 5 by the Corresponding members, and 2 by strangers. Of these papers 22 were written, this being a much larger proportion than last year. The entire 29 papers have been furnished by 11 persons.

"There have been added to the library during the past year 214 publications, and it now contains 874 volumes and pamphlets, as follows : 76 quartos, 24 royal octavos, and 774 octavos. The work of indexing the library is about

completed, more than five thousand title-slips having been written.

"The Society has issued the usual 'Abstract of Proceedings,' consisting of seventeen pages, to which were appended a paper on 'Milicete Indian Natural History,' by Mr. Tappan Adney, and an index to Abstracts iv. and v., making a pamphlet of 41 pages. The customary distribution was made."

The Treasurer presented his annual report, showing a balance on hand of \$300.07.

The Audubon Monument Committee made a final report and was discharged. The committee for conference with other New York scientific societies, the Committee on Finance, and the Lecture Committee, submitted reports, which were adopted and placed on file.

The following officers were elected for the ensuing year :

President, J. A. Allen, Ph. D.

Vice-President, Mr. Frank M. Chapman.

Secretary, Mr. Walter W. Granger.

Treasurer, Mr. L. S. Foster.

J. A. Allen, Ph. D., presented a paper on "The Seasonal Changes of Color in the Northern Varying Hare (*Lepus americanus*)."

This paper was illustrated by specimens showing that the change from the brown summer coat to the white dress of winter was due entirely to moult, and not through the blanching of the summer coat. [See "Bull. Am. Mus. Nat. Hist.," Vol. vi., pp. 107-128.]

A second paper, also by Dr. Allen, was entitled "The First or Nestling Plumage of Various Species of North American Birds." Specimens were shown illustrating the character of the first plumage in various families of North American birds, and attention was called to the desirability of collecting specimens of birds at this early stage, the first or nestling plumage of many birds being still unknown.

Mr. W. W. Granger referred to the extraordinary wing power of quite young Ruffed Grouse (*Bonasa umbellus*).

Recent Progress in the Study of North American Mammals.

BY J. A. ALLEN.

Three years since I presented a paper to the New York Academy of Sciences on "Recent Work in North American Mammalogy,"¹ giving a brief review of the principal works relating to North American Mammals, and dwelling in some detail upon the history of the subject from the year 1852 to the year 1890, comparing and contrasting the methods, the results, and the resources of the three periods into which these four decades may be divided. The concluding paragraph of this paper may be here quoted as a fitting introduction to the present article, as follows: "While, ten or twelve years ago, it was commonly supposed that comparatively little remained to be learned respecting the mammals of North America, beyond a few details regarding their distribution and habits, we are now little less than awed by the evident extent of our ignorance of the subject, as shown by the astonishing discoveries of the last four or five years, and recognize the obvious necessity of a careful revision of the whole field" (l. c., p. 84). The results of the work of the last three years show that this statement, though a surprise to those unfamiliar with the then recent developments, was none too strong.

While this paper will relate mainly to the work of the last five years, it is desirable, for a proper understanding of

¹ Trans. N. Y. Acad. Sci., Vol. X., 1891, pp. 71-85.

the subject, to extend the field of view somewhat further into the past, summarizing briefly some portions of the paper already cited. Beginning then with what may be termed the Bairdian period we may trace in outline the history of the subject as regards (1) methods, (2) resources, and (3) results.

(1.) METHODS.—From 1850 to about 1865 the chief incentive to research in this field was apparently the discovery of new forms. The subjects of individual and seasonal variation were to a large extent necessarily neglected; their importance even had not come to be duly appreciated, there being rarely available for study a series of specimens of any species of sufficient extent to throw much light upon either of these questions. Neither was much attention paid to the equally important subject of geographic variation, for the very good reason that adequate material for its investigation did not exist. Accordingly very slight differences, especially if accompanied by a difference of habitat in the specimens presenting them, were regarded as of specific importance. The word subspecies, in its modern sense, was an unknown term in biologic terminology.

Following Baird's work, done mainly between 1852 and 1858, was a considerable interval of almost complete inactivity. There was, it is true, a gradual increase of material in a few of the principal museums, notably that under the direction of the Smithsonian Institution, but little was done toward its elaboration between the years 1860 and 1870.

At about this later date new workers entered the field, and with the greatly increased material at their disposal it became possible to take up, in the case of a few species, the neglected subjects of individual, seasonal, and geographic variation. It was found that many differences—as of size, color, and even in the relative size of different parts—which had previously been depended upon as of specific importance, were open to suspicion. These dis-

coveries, while unquestionably important, unfortunately sometimes led to erroneous conclusions. They formed, however, a phase of progress; although they gave the pendulum a swing in the right direction, the impetus was too great; the tendency to excessive subdivision gave place to a brief period of undue lumping.

Later, with the rapid increase of material, a healthy reaction followed, although there came with it, for a time and in certain quarters, a tendency to excessive subdivision along the line of subspecies. But the continued rapid accumulation of fresh material, it is to be hoped, will supply the required antidote, especially in the case of investigators having access to large collections.

(2.) RESOURCES.—Professor Baird had as the basis for his great work on North American Mammals what was then looked upon as a large collection. Compared with what previous workers had possessed, it was indeed enormous; compared with the collections of to-day it was very small, and the wonder is that his work based thereon so well stands the test of time. Doubtless more specimens have been gathered during any one of the last four years than Professor Baird had for the entire basis of his great monograph, which will ever remain a monument to his sagacity and accurate and painstaking methods.

But the *amount* of material available for study in recent years, in comparison with that available twenty to forty years ago, is only one of the points to be considered, the difference in *quality* being a far more important factor in the case than the difference in quantity. In the earlier days it was a rare thing to have any considerable number of specimens of the same species from any one locality, even the larger collections consisting of what might be termed sporadic material,—a specimen or two from one locality, and a few more from other localities, separated by perhaps hundreds of miles. Furthermore they were often without precise data as to either place or time of collection. The skull, as a rule, was left in the skin, and hence could

be examined only by great labor and serious injury to the skin. The skins themselves were often left flat, or rolled up, or greatly over-stuffed, or otherwise distorted, with the ears crumpled, the toes and feet bent at all angles, and the tail shrunk or broken, so that through the faults of careless taxidermy accurate measurements were almost impossible, and even approximate ones were difficult to obtain. Well-prepared and carefully labeled specimens were the exception. Large numbers of the smaller mammals, it is true, were preserved in alcohol, and were thus available for measurement and for anatomical examination, but such material is almost useless for the study of color characters, and very inconvenient for comparative study in respect to specific and subspecific differences. Specimens of mammals preserved in spirits or other solutions are also in this respect very untrustworthy, from the fact that the coloration of the pelage is so liable to undergo great change, especially if wood alcohol or alum solutions happen to be the preservative employed.

Very different indeed from all this is the present method of forming collections of the smaller mammals. Now series of specimens of the same species, from the same locality, numbering from ten to fifty or more, are almost the rule; and it is considered essential, wherever possible, to have the series duplicated at different seasons of the year, in order to show the seasonal variation. Of course this has not yet been done for all species, but it is the aim to collect as far as possible on this plan. The skull is removed from the skin, carefully cleaned and preserved separately, and cross-reference numbers refer to both skin and skull, so that they may be studied together. Several measurements of the animal are taken by the collector, who has special instructions in this regard, before skinning, and recorded on the label; the skin is then carefully filled to the natural size as indicated by the measurements, the tail vertebrae being replaced by a wire; then, in pinning the specimen out to dry, the tail and the feet are carefully extended in straight

lines, and the ears given a natural set, with the result of rendering all of the external characters readily available for study. Such a specimen is also a pleasing object to the eye, in comparison with the commonly more or less distorted and unattractive specimens of earlier days. Furthermore, not only is the sex, date, and place of collection given on the label, but the altitude of the locality, if in a mountainous district, is also recorded.

With the old-time material it was often difficult to determine satisfactorily even the color characters of a specimen, to say nothing of size and proportions, owing to its faulty preservation; while in that of to-day all of the external features can be utilized, in addition to the measurements taken by the collector from the animal before skinning. Thus in respect to resources the worker of to-day has advantages immensely superior to those of his predecessors prior to a very recent date.

As is well known to mammalogists generally, and as I have before stated,¹ this great improvement in the amount and character of the material now available for investigation is due primarily to the enthusiastic and well-directed efforts of Dr. C. Hart Merriam, Chief of the Division of Ornithology and Mammalogy of the United States Department of Agriculture.

(3.) RESULTS.—As already indicated, methods of research have undergone radical change since 1857, the date of Baird's great work on North American mammals. While new forms are still looked for with considerable avidity, it is not by any means so much the end and main purpose of investigation as was the case thirty to forty years ago. Then the idea of evolution by environment had scarcely been suggested and formed no part of the working hypothesis of the naturalist. Twenty years ago it had become fairly established. At the present time the relation of forms to each other, geographically and phylogenetically, and to their environment, is the one interest-

¹ Trans. N. Y. Acad. Sci., X., p. 84.

ing problem underlying the whole subject. There is no more fascinating or profitable work for the student of the present mammalian fauna of North America than the tracing out of the habitats, and determining the intergradation or non-intergradation of such forms as compose many of our leading genera of mammals. We have as yet scarcely reached the point where this can be done with entire certainty for any group, but here and there boundaries have been established, and we can begin to foresee in some instances what will be the final results. Should the activity of the last five years be continued for the next decade, it will doubtless be possible at the end of that time to map the distribution of most of our mammals with considerable accuracy; to know what forms intergrade, and over what areas and under what conditions the intergradation occurs; also what are sharply isolated and localized, though closely related to others; and in many instances to determine the lines of evolution and of closest genetic relationship among the congeneric forms of several of the leading families.

A few statistics will throw into strong light some at least of the results of work during the last ten years. In 1884 Mr. Frederick W. True, Curator of Mammals in the United States National Museum, published "A Provisional List of the Mammals of North and Central America, and the West Indies,"¹ which fairly reflected the status of the subject as then understood. Mr. True's List contained 378 species and 45 subspecies—a total of 423 recognized forms. At the present time the number, as nearly as can conveniently be determined, is 732 species and 131 subspecies, or a total of 863—an increase exceeding 100 per cent., mainly within the last five years. These additions include 8 new genera and about 12 new subgenera, while 10 groups rated as subgenera in 1884 have been raised to the rank of genera. On the other hand, however, several genera have

¹ Proc. U. S. Nat. Mus., VII., 1884, pp. 587-611.

been reduced to subgeneric rank, and several others entirely canceled.¹

In this connection we will consider North America not in its continental or geographic sense but as commonly faunally limited, or as defined in the A. O. U. Check-List of North American Birds, namely, North America north of Mexico but including Lower California. In the following statistical comparison we will also exclude the marine mammals, as the Whales and Porpoises. Taking the species by ordinal groups we have the following results :

Marsupials (Opossums): 1884, 1 species; 1894, 1 species and 1 subspecies.

Edentates (Armادillos, etc.): 1884, 1 species; 1894, 1 species.

Ungulates (Deer, Antelope, Sheep, etc.): 1884, 12 species and 3 subspecies; 1894, 12 species and 4 subspecies.

Rodents (Squirrels, *Spermophiles*, Gophers, Mice, Rats, Pocket Mice, Kangaroo Rats, Porcupines, Hares, etc.): 1884, 80 species and 34 subspecies; 1894, 231 species and 105 subspecies,—an increase of 151 species and 71 subspecies, or nearly 200 per cent.

Bats: 1884, 15 species; 1894, 25 species,—an increase of 60 per cent.

Insectivores (Moles and Shrews): 1884, 19 species and 1 subspecies; 1894, 30 species and 3 subspecies,—an increase of 65 per cent.

Carnivores (Bears, Wolves, Cats, Skunks, Weasels, etc.): 1884, 53 species and 4 subspecies; 1894, 69 species and 12 subspecies,—an increase of 42 per cent.

As would be expected, the increase proves to be greatest among the smaller nocturnal and burrowing species, as the Pocket Mice, Kangaroo Rats, Gophers, *Spermophiles*, Voles and other Field Mice, Shrews and Moles, where the increase in different groups ranges from 60 to 200 per cent. as against 15 to 40 per cent. among the Ungulates and

¹ In October, 1892, Mr. Walter E. Bryant published a very useful paper entitled "Recent Additions to the North American Mammal Fauna" (*Zoe*, III., pp. 201-223), giving a list of additions made between 1884 and October, 1892, with notes on the changes that had occurred in nomenclature. Although restricted to that part of North America north of Mexico, the changes in generic names number 17, mainly due to the revival of older names for those current in 1884, or through the raising of subgeneric names to generic rank, or the relegation of generic names to subgeneric rank, with about three subgenera and five generic names proposed for new groups or for pre-occupied names. The paper records 190 species and subspecies as actual additions to the list of 1884.

Carnivores. In other words, the larger and diurnal species, as the Deer and larger Carnivores, were relatively better known in 1884 than the smaller species that burrow in the ground and are for the most part abroad only at night.

These statistics, however, very inadequately express the results of the work of the last decade,—or more correctly of the last seven years, for little advance was made prior to 1887. Since this date have been made not only the additions and other changes indicated above, but many radical changes in the nomenclature of species have been found necessary, in consequence of the former misapplication of names. Also many forms formerly ranked as subspecies have been found to be entitled to specific rank; many names that had been reduced to synonyms have been revived for forms which prove to be tenable as subspecies, and to which they were evidently intended to apply, though originally very inadequately characterized. Again, forms originally characterized as species, and known only from limited areas and few specimens, have proved separable into several well-marked subspecies, and in some instances into species, and their known geographic range greatly extended.

In order to emphasize some of these points it will be necessary to pass in review a few special groups. Although little monographic work has as yet been attempted, owing to lack of material and time for final revisionary work, yet the results that have been reached in the few instances in which such work has been undertaken have stood the test of re-examination much better than might have been expected. It is almost too soon yet for final work in any group, but we may hope to reach the point ere long when the material will be sufficiently abundant to warrant the attempt, in the case at least of some of the better known generic groups.

The following genera will be taken in illustration of the subject: *Lepus*, *Heteromys*, *Perognathus*, *Dipodomys*, *Perodipus*, *Thomomys*, *Geomys*, *Phenacomys*, *Erotomys*, *Synap-*

tomys, *Arvicola*, *Neotoma*, *Sigmodon*, *Oryzomys*, *Onychomys*, *Sitomys*, *Sciurus*, *Tamias*, *Spermophilus*, and *Spilogale*; or, practically the families Leporidae, Heteromyidae, Geomyidae, Muridae, and Sciuridae.¹

In 1884 the genus *Lepus*, or the Hares, was recognized in Mr. True's List as consisting of 11 species and 7 additional subspecies; it now numbers 24 species and 8 subspecies. Of the new forms 9 have been added from the United States² and 5 from Mexico.

¹ In the following review, and in the lists given in the footnotes, North America is taken in its geographic sense, and the subject is brought down to June, 1894. The writer assumes no responsibility as an endorser of the species and subspecies recorded in the lists, which are in no sense revisionary, but merely intended to reflect the present status of the subject as it stands in the literature of this date. To give the lists consistency, and to facilitate comparison with the 1884 List, a few changes have been made in the generic allocation of some of the recently described forms, followed always, however, by the name employed by the original describer.

² The United States list of additions is as follows:

Lepus sylvaticus floridanus Allen, Bull. Am. Mus. Nat. Hist., III., p. 160, Oct., 1890. Brevard Co., Fla.

Lepus sylvaticus bachmani (Waterhouse). Revived by Allen, Bull. Am. Mus. Nat. Hist., VI., p. 170, May, 1894. Texas.

Lepus sylvaticus mearnsii Allen, *ibid.*, p. 171, May, 1894. Minnesota and adjoining portions of the Upper Mississippi region.

Lepus idahoensis Merriam, N. Am. Fauna, No. 5, p. 75, July, 1891. Idaho and northern Nevada.

Lepus cinerascens Allen, Bull. Am. Mus. Nat. Hist., III., p. 159, Oct., 1890. Southern California.

Lepus insularis Bryant, Proc. Cal. Acad. Sci., 2d Ser., III., p. 92, April, 1891. Espiritu Santo Island, Lower California.

Lepus alleni Mearns, Bull. Am. Mus. Nat. Hist., II., p. 294, Feb., 1890. Arizona.

Lepus melanotis Mearns, *ibid.*, p. 297., Feb., 1890. Kansas, Indian Territory, and western Texas.

Lepus paludicola Miller and Bangs, Proc. Biol. Soc. Wash., IX, p. 105, June 9, 1894. Western Florida.

Mexican and Central American species recently added are the following:

Lepus sylvaticus aztecus Allen, Bull. Am. Mus. Nat. Hist., III., p. 188, Dec., 1890. Isthmus of Tehuantepec, Mexico.

Lepus orizabæ Merriam, Proc. Biol. Soc. Wash., VIII., 1893, p. 143. Mt. Orizaba, Mexico.

The genus *Heteromys*, which is developed mainly in Mexico and Central America, one species barely reaching the lower Rio Grande valley in the United States, has been added to the United States fauna,¹ and the number of species raised from 3 in 1884 to 9, with an additional subspecies, in 1894.²

The genus *Perognathus* has been increased from the 6 forms recognized in 1884 to 29.³ The range of characters,

Lepus veracrucis Thomas, P. Z. S., 1890, p. 74, pl. vi. Jalapa, Mexico.

Lepus insolitus Allen, Bull. Am. Mus. Nat. Hist., III., p. 189, Dec. 1890. Plains of Colima, Mexico.

Lepus truei Allen, *ibid.*, p. 192. Mirador, near Vera Cruz, Mexico.

¹ Allen, Bull. Am. Mus. Nat. Hist., III., pp. 268-272, June, 1891. See also Allen and Chapman, *ibid.*, V., pp. 218-220, Sept., 1893.

² Cf. Thomas, Ann. and Mag. Nat. Hist. (6), XI., 1893, pp. 329-332, and *ibid.*, XII., pp. 233, 234.

The forms of this genus recently recognized by Mr. Oldfield Thomas appear to be as follows:

Heteromys alleni Coues. Lower Rio Grande Valley. (Cf. Allen, as cited above.)

Heteromys bulleri Thomas, Ann. and Mag. (6), XI., p. 330, April, 1893. La Laguna, Sierra de Juanacatlan, Jalisco, Mexico.

Heteromys salvini Thomas, *ibid.*, p. 331. Dueñas, Guatemala.

Heteromys salvini nigrescens Thomas, *ibid.*, XII., p. 234, Sept., 1893. Costa Rica.

Heteromys pictus Thomas, *ibid.*, p. 233, Sept., 1893. Mineral San Sebastian, Jalisco, Mexico.

Heteromys longicaudus Gray, P. Z. S., 1868, p. 204. "Hondurus" (= Venezuela *apud* Alston, Biol. Cent. Am. Mam., p. 167.)

Heteromys irroratus Gray, *ibid.*, p. 205. Oaxaca, Mexico.

Heteromys albolimbatus Gray, *ibid.*, p. 205. La Parada, Mexico.

Add also, to complete the list of the recorded species:

Heteromys longicaudatus Gray, *ibid.*, p. 204, Mexico.

Heteromys desmarestianus Gray, P. Z. S., 1843, p. 79, and 1868, p. 204. Coban, Guatemala.

Heteromys adspersus Peters, Monatsb. Ak. Berlin, 1874, p. 357. Panama.

Heteromys anomalus (Thompson). Trinidad.

³ Cf. Merriam, N. Am. Fauna, No. 1, pp. 1-29, pl. i-iv. Oct., 1889.

The following were here recognized by Dr. Merriam, of which 15 were described as new:

Perognathus fasciatus Wied. Upper Missouri, near its junction with the Yellowstone.

Perognathus fasciatus flavescens Merriam. Kennedy, Neb.

both external and cranial, in this genus is strikingly great, yet the transition between the extreme phases of the group is so gradual that it is difficult to separate it into more than two subgenera, and these are by no means trenchantly limited.

In Mr. True's List the genus *Dipodomys* contained 1 species with 1 subspecies. The group has since been

Perognathus flavus Baird. Western Texas.

Perognathus bimaculatus Merriam. Arizona.

Perognathus longimembris (Coues). Southern California.

Perognathus apache Merriam. Apache Co., Arizona.

Perognathus inornatus Merriam. Fresno, Cal.

Perognathus olivaceus Merriam. Kelton, Utah.

Perognathus olivaceus amoenus Merriam. Nephi, Utah.

Perognathus monticola Baird. Montana.

Perognathus formosus Merriam. St. George, Utah.

Perognathus intermedius Merriam. Mud Spring, Arizona.

Perognathus fallax Merriam. Southern California.

Perognathus obscurus Merriam. Grant Co., N. Mex.

Perognathus spinatus Merriam. Lower Colorado River, Cal.

Perognathus penicillatus Woodhouse. San Francisco Mountain, Arizona.

Perognathus hispidus Baird. Charco Escondido, Mexico.

Perognathus paradoxus Merriam. Trego Co., Kansas.

Perognathus paradoxus spilotus Merriam. Cook Co., Texas.

Perognathus californicus Merriam. Berkely, Cal.

Perognathus armatus Merriam. Mount Diablo, Cal.

Two other "undetermined species" were also mentioned, namely, *Perognathus lordi* (Gray) and *Perognathus mollipilosus* Coues. There have since been added :

Perognathus fuliginosus Merriam, N. Am. Fauna, No. 3, p. 74, Sept., 1890. San Francisco Mountain, Arizona.

Perognathus femoralis Allen, Bull. Am. Mus. Nat. Hist., III., p. 281, June, 1891. San Diego Co., Cal.

Perognathus merriami Allen, *ibid.*, IV., p. 45, March, 1892. Southeastern Texas.

Perognathus infraluteus Thomas, Larimer Co., Col.

Perognathus lordi (Gray). British Columbia. Revived by Rhoads, Proc. Acad. Nat. Sci. Phila., 1893, p. 405, Jan. 27, 1894.

Perognathus copei Rhoads, *ibid.*, p. 404. Staked Plains, Texas.

Perognathus alticolus Rhoads, *ibid.*, p. 412. San Bernardino Mts., Cal.

Perognathus latirostris Rhoads, Am. Nat., XXVIII., Feb., 1894, p. 185. "Rocky Mountains."

divided into two genera,¹ *Dipodomys* and *Perodipus*,² with

¹ Cf. Merriam, N. Am. Fauna, No. 3, p. 72, Sept., 1890. *Dipodops*, gen. nov., later changed to *Perodipus* Fitzinger, an earlier name based on the same type. (Cf. Merriam, Proc. Biol. Soc. Wash., VII., p. 26, April, 1892.)

² Following are the recorded species and subspecies of these two genera :

Dipodomys phillipsi Gray. Valley of Mexico and adjacent mountain slopes and plains. (On this species see an important paper by Merriam, Proc. Biol. Soc. Wash., VIII., pp. 83-96, July 18, 1893.)

Dipodomys ornatus Merriam, Proc. Biol. Soc. Wash., IX, p. 110, June 21, 1894. Berriozabal, Zacatecas, Mexico.

Dipodomys perotensis Merriam, *ibid.*, p. 111. Perote, Vera Cruz, Mexico.

Dipodomys elator Merriam, *ibid.*, p. 109. Henrietta, Clay Co., Texas.

Dipodomys deserti Stephens, Am. Nat., XXI., Jan., 1887, p. 42, pl. v. Deserts of Southeastern California.

Dipodomys merriami Mearns, Bull. Am. Mus. Nat. Hist., II., p. 290, Feb., 1890. Arizona.

Dipodomys merriami melanurus Merriam, Proc. Cal. Acad. Sci. (2), III., p. 345, June, 1893. San José del Cabo, Lower California.

Dipodomys merriami nevadensis Merriam, Proc. Biol., IX., p. 111, June 21 1894, Pyramid Lake, Nevada.

Dipodomys merriami nitratus Merriam, *ibid.*, p. 112. Keeler, east side of Owens Lake, California.

Dipodomys merriami nitratooides Merriam, *ibid.*, p. 112. San Joaquin Valley, California.

Dipodomys merriami exilis Merriam, *ibid.*, p. 113. Fresno, San Joaquin Valley, California.

Dipodomys merriami atronasus Merriam, *ibid.*, p. 113. Hacienda La Parada, San Luis Potosi, Mexico.

Dipodomys ambiguus Merriam, N. Am. Fauna, No. 4, p. 42, Oct., 1890. El Paso, Texas.

Dipodomys spectabilis Merriam, *ibid.*, p. 46. Cochise Co., Arizona.

Dipodomys californicus Merriam, *ibid.*, p. 49. Mendocino Co., Cal.

Dipodomys simiolus Rhoads, Proc. Acad. Nat. Sci. Phila., 1893, p. 410, Jan. 27, 1894. Agua Caliente, California.

Dipodomys similis Rhoads, *ibid.*, p. 411. San Diego Co., California.

Dipodomys parvus Rhoads, Am. Nat., XXVIII., Jan., 1894, p. 70. San Bernardino Valley, California.

Perodipus agilis (Gambel). Southern California.

Perodipus ordii (Woodhouse). Western Texas.

Perodipus ordii palmeri (Allen), Bull. Am. Mus. Nat. Hist., III., p. 276, June, 1891. San Luis Potosi, Mexico.

Perodipus ordii columbianus Merriam, Proc. Biol. Soc. Wash., IX, p. 115, June 21, 1894. Umatilla, Plains of Columbia, Oregon.

Perodipus streator Merriam, *ibid.*, p. 113. Carbondale, Mariposa Co., Cal.

Perodipus panamintinus Merriam, *ibid.*, p. 14. Panamint Mountains, California.

12 species and 6 subspecies in the former, and 9 species and 2 subspecies in the latter, or a total increase of from 2 to 29 forms, with a considerable extension of the known range of the group. Besides these additions, an allied genus *Microdipodops* has been described from Halleck, Nevada,¹ which combines the external characters of some of the species of *Perognathus* with many of the cranial characters of *Perodipus*.

The Pocket Gophers form a group of burrowing Rodents, restricted to North America, and constituting two strongly marked genera, *Thomomys* and *Geomys*. They live almost wholly underground, and can be secured only by trapping them in their burrows. In Mr. True's List *Thomomys* is credited with two species (one of them then known only from the type specimen) and two additional subspecies. This genus has now 16 species and 1 subspecies,² and its

Perodipus richardsoni (Allen), Bull. Am. Mus. Nat. Hist., III, p. 277. Oklahoma Territory.

Perodipus sennetti (Allen), *ibid.*, p. 226, April, 1891. Cameron Co., Texas.

Perodipus compactus (True), Proc. U. S. Nat. Mus., XI., p. 160. Jan. 5, 1889. Padre Island, Texas.

Perodipus chapmani (Mearns), Bull. Am. Mus. Nat. Hist., II., p. 291, Feb., 1890. Fort Verde, Arizona.

Perodipus longipes (Merriam), N. Am. Fauna, No. 3, p. 71, Sept., 1890. Painted Desert, Arizona.

¹ Merriam, N. Am. Fauna, No. 5, p. 115, July 30, 1891. Type, *M. mega-cephalus*, sp. nov.

² For a recent preliminary revision of the genus see Allen, Bull. Am. Mus. Nat. Hist., V., 1893, pp. 47-68. On *T. bulbivorus* see an important paper by Gerrit S. Miller, Jr., Proc. Biol. Soc. Wash., VIII., pp. 113-116., Aug., 1893.

Following is a list of the United States species :

| | |
|---|------------------------------------|
| <i>Thomomys bulbivorus</i> (Rich.). | <i>Thomomys clusius</i> Coues. |
| <i>Thomomys laticeps</i> Baird. | <i>Thomomys talpoides</i> (Rich.). |
| <i>Thomomys bottæ</i> (Eyd. and Gerv.). | <i>Thomomys fulvus</i> (Woodh.). |
| <i>Thomomys townsendii</i> (Rich.). | <i>Thomomys perpallidus</i> Merr. |
| <i>Thomomys monticolus</i> Allen. | <i>Thomomys aureus</i> Allen. |
| <i>Thomomys douglasii</i> (Rich.). | <i>Thomomys fossor</i> Allen. |
| <i>Thomomys douglasii fuscus</i> (Merr.). | <i>Thomomys toltecus</i> Allen. |

known geographical range has been extended far to the southward in Mexico. This genus has the further curious history that of the 12 forms recently added 5 of them were described some thirty years ago and had lapsed into synonymy. While many of the species closely resemble each other externally they are easily separated by cranial differences.

In 1884 *Geomys* was credited with 5 species, three of which were known only from the United States, and the others, one each respectively, from Mexico and Central America. The recognized United States forms have been increased to 6, and the Mexican and Central American forms to 9, or a total increase of from 5 to 15.¹ A monographic revision of the genus has been undertaken by Dr. Merriam and is nearly ready for publication, with numerous figures of cranial characters and distribution maps of the species.

While the increase in our knowledge of the two families Heteromyidæ² and Geomyidæ, or the Pouched Rats and Pocket Gophers, has been so great, it has scarcely been less so in respect to the Muridæ. Here the ratio of increase in the number of recognized forms is not only very high,

Recently described Mexican species are :

Thomomys orizabæ Merriam, Proc. Biol. Soc. Wash., VIII., p. 145, Dec. 1893. Mt. Orizaba, Mexico.

Thomomys peregrinus Merriam, *ibid.*, p. 146. Salazar, State of Mexico.

¹ The present status of the group is as follows, the United States species being :

Geomys tuza (Ord).

Geomys castanops (Baird).

Geomys bursarius (Shaw).

Geomys personatus True.

Geomys bursarius lutescens Merriam. *Geomys clarkii* Baird.

The Mexican and Central American species are :

Geomys mexicanus (Licht.).

Geomys scalops Thomas.

Geomys gymnurus Merriam.

Geomys hispidus Le Conte.

Geomys nelsoni Merriam.

Geomys cherriei Allen.

Geomys merriami Thomas.

Geomys fumosus Merriam.

Geomys grandis Thomas.

² Saccomyidæ of Baird, Lilljeborg, Coues, etc. As *Sacomys* is a synonym of *Heteromys* it becomes untenable as the basis of the family name. Heteromyidæ is equal to Heteromyinæ of Alston, 1876.

but there has also been a notable increase in the number of genera and subgenera, and changes in the status of several of those previously recognized, as well as in the nomenclature of some of the older species. The old genus *Hesperomys* has not only been dismembered by the raising of the United States subgenera *Vesperimus* (Coues = *Sitomys* Fitzinger, of earlier date), *Onychomys* and *Oryzomys*, and the Mexican and Central American *Tylomys*, *Rhipodomys*, and *Abrothrix* to full generic rank, but a new subgenus *Baiomys*¹ has been proposed, and the name *Hesperomys* discarded as untenable, at least so far as the North American Muridæ are concerned.² The genus *Phenacomys* was described by Dr. Merriam³ in 1889, with 4 species, to which others have since been added.⁴

This is a boreal type which barely reaches the mountainous portions of the United States, north of which it ranges across the continent from ocean to ocean; yet prior to 1889 not a specimen appears to have been seen, or at least critically examined, by any naturalist.

The Red-backed Meadow Mice, forming the genus *Evotomys*, known from 1 species and 1 additional subspecies in 1884, now numbers 9 species with 3 additional subspecies,

¹ True, Proc. U. S. Nat. Mus. XVI., p. 758, Feb., 1894. Type, *Hesperomys taylori* Thomas.

² Cf. Allen, Bull. Am. Mus. Nat. Hist., III., pp. 291-294, June, 1891.

³ N. Am. Fauna, No. 2, pp. 27-35, Oct., 1889.

⁴ *Phenacomys intermedius* Merriam, N. Am. Fauna, No. 2, p. 32, Oct., 1889. Kamloops, British Columbia.

Phenacomys celatus Merriam, *ibid.*, p. 33. Godbout, P. Q., Canada.

Phenacomys latimanus Merriam, *ibid.*, p. 34. Fort Chimo, Ungava, Labrador.

Phenacomys ungava Merriam, *ibid.*, p. 35, Fort Chimo, Ungava, Labrador.

Phenacomys longicaudus True, Proc. U. S. Nat. Mus., XIII., p. 303, Nov., 1890. Coos Co., Oregon.

Phenacomys orophilus Merriam, N. Am. Fauna, No. 5, p. 65, July, 1891. Idaho.

some of the new forms differing radically in coloration from those earlier known.¹

Mr. True has recently described a new genus *Myctomys*² from Fort Chimo, Ungava, Labrador, which appears to combine somewhat the characters of the genera *Phenacomys* and *Synapatomys*.

The Lemming Mouse, forming the still monotypic genus *Synaptomys*, has had its known range remarkably extended, and furnishes a cogent commentary upon our lack of knowledge of the mammalian fauna of even the long-settled parts of the United States. A few years since this species (*S. cooperi*) was positively known only from southern Illinois, Indiana and Ohio, east of the Mississippi River, though the type of the species was reputed to have come from either New York or New England, or possibly from New Jersey. Recently Dr. Merriam reported its occurrence in Maryland, in Virginia, in the mountains of North Carolina, and at Alfred Centre, N. Y.³ It has since

¹ The following have been recorded :

Evotomys rutilus (Pallas). "Circumpolar regions."

Evotomys gapperi (Vigors). Northern border of eastern United States.

Evotomys gapperi ochraceus Miller, Proc. Boston Soc. Nat. Hist., XXVI., p. 193, March 24, 1894. White Mts., N. H.

Evotomys gapperi rhoadsi Stone, Am. Nat., Jan., 1893, p. 55. May's Landing, N. J.

Evotomys gapperi brevicaudus Merriam, No. 5, p. 66, July, 1891. Black Hills, South Dakota.

Evotomys carolinensis Merriam, Am. Journ. Sci., XXXVI., Dec., 1888, p. 460. Mountains of North Carolina.

Evotomys dawsoni Merriam, Am. Nat., July, 1889, p. 649. Finlayson River, N. W. T.

Evotomys galei Merriam, N. Am. Fauna, No. 4, p. 23, Oct., 1890. Boulder County, Colorado.

Evotomys occidentalis Merriam, *ibid.*, p. 26. Chehalis Co., Washington.

Evotomys californicus Merriam, *ibid.*, p. 26. Humboldt Co., California.

Evotomys idahoensis Merriam, *ibid.*, No. 5, p. 66, July, 1891. Salmon River Mountains, Idaho.

Evotomys fuscodorialis Allen, Bull. Am. Mus. Nat. Hist., VI., p. 103, April, 1894. New Brunswick.

² Proc. U. S. Nat. Mus., XVII., p. 2 (of advance sheet), April 26, 1894, Type *M. innuitus*, sp. nov.

³ Merriam, Proc. Biol. Soc. Wash., VII., pp. 175-177, Dec., 1892.

been taken in Southern New Jersey,¹ and in Wareham, Massachusetts.² As Dr. Coues,³ in 1877, reported it from Kansas, Oregon, and Alaska, the genus has probably a wide distribution, and may be found to embrace several quite distinct forms. It evidently occurs in the East over portions of the country where it has escaped all collectors for half a century, since, as compared with other field mice, it proves to be a singularly difficult species to trap. Indeed, the Virginia and New York records rest on skulls found in pellets from stomachs of owls, and the Maryland record on a specimen taken from the stomach of a hawk.

A Meadow Mouse, also with grooved incisors, like *Synaptomys*, has been recently described by Mr. Rhoads from Kittitas Co., Washington, as the type of a new genus *Aulacomys*.⁴

The genus *Arvicola*, embracing the common Meadow Mice, has been increased in the last ten years from 8 species and 2 subspecies to 15 species and 5 subspecies.⁵

The Wood Rats (*Neotoma*) and Cotton Rats (*Sigmodon*) have undergone corresponding revision and increase. Not only has *Neotoma micropus* of Baird been revived, but the number of forms of *Neotoma* has been raised from 4 to

¹ S. N. Rhoads, Am. Nat., Jan., 1893, p. 53. Described as *Synaptomys stonei*, sp. nov.

² Outram Bangs, Proc. Biol. Soc. Wash., IX., pp. 99-104, April, 1894.

³ Mon. N. Am. Roden., pp. 235, 236.

⁴ Am. Nat., Feb. 1894, p. 182. Type *A. arvicoloides*, sp. nov.

⁵ Additions subsequent to Bryant's List of 1892 are as follows:

Arvicola edax Baird (Revived; cf. Allen, Bull. Am. Mus. Nat. Hist., V., 1893, p. 184.)

Arvicola aztecus Allen, *ibid.*, p. 73, April, 1893. Aztec and La Plata, New Mexico.

Arvicola operarius Nelson, Proc. Biol. Soc. Wash., VIII., p. 139, Dec., 1893. St. Michaels, Norton Sound, Alaska.

Arvicola phaeus Merriam, *ibid.*, VII., p. 171, Sept., 1892. Sierra Nevada de Colima, Jalisco, Mexico.

Arvicola chrotorrhinus Miller, Proc. Bost. Soc. Nat. Hist., XXVI., p. 190 March, 1894. White Mts., N. H.

40. Four forms have been revived, and 22 species and 10 subspecies¹ have been described as new !

¹ *Neotoma cinerea* (Ord).

Neotoma cinerea occidentalis (Baird). Revived by Allen, Bull. Am. Mus. Nat. Hist., III., p. 287, June, 1891.

Neotoma cinerea drummondii (Rich.). Revived by Merriam, Proc. Biol. Soc. Wash., VII., p. 25, April, 1892.

Neotoma occidentalis fusca True, Proc. U. S. Nat. Mus., XVII., No. 1,006, p. —, (advance sheet, p. 2, June 27, 1894). Fort Umpqua, Oregon.

Neotoma lepida Thomas, Ann. and Mag. Nat. Hist. (6), XII., p. 235, Sept., 1893. Utah.

Neotoma arizonæ Merriam, Proc. Biol. Soc. Wash., VIII., p. 110, July, 1893. Eastern Arizona and New Mexico.

Neotoma floridana (Ord).

Neotoma pennsylvanica Stone, Proc. Acad. Nat. Sci. Phila., 1893, p. 16. Cumberland Co., Pa.

Neotoma mexicana Baird. Revived by Merriam, N. Am. Fauna, No. 3, p. 67, Sept. 1890.

Neotoma mexicana bullata Merriam, Proc. Biol. Soc. Wash., IX., p. 122, July 2, 1894. Santa Catalina Mts., Arizona.

Neotoma leucodon Merriam, *ibid.*, p. 120. San Luis Potosi, Mexico.

Neotoma latifrons Merriam, *ibid.*, p. 121. Querendaro, Michoacan, Mexico.

Neotoma fulviventer Merriam, *ibid.*, p. 121. Toluca Valley, Mexico.

Neotoma orizabæ Merriam, *ibid.*, p. 122. Mt. Orizaba, Puebla, Mexico.

Neotoma baileyi Merriam, *ibid.*, p. 123. Valentine, Nebraska.

Neotoma fallax, Merriam, *ibid.*, p. 123. Gold Hill, Boulder Co., Colorado.

Neotoma desertorum Merriam, *ibid.*, p. 125. Furnace Creek, Death Valley, California.

Neotoma desertorum sola Merriam, *ibid.*, p. 126. San Emigdio, Kern Co., California.

Neotoma orolestes Merriam, *ibid.*, p. 128. Saugache Valley, Colorado.

Neotoma albigula Hartley, Proc. Cal. Acad. Sci. (2), IV., p. 157, pl. xii., skull, May 9, 1894. Fort Lowell, Arizona.

Neotoma micropus Baird. Revived by Allen, Bull. Am. Mus. Nat. Hist., III., p. 282., June, 1891.

Neotoma micropus canescens Allen, *ibid.*, p. 285. Oklahoma Territory.

Neotoma fuscipes Baird.

Neotoma fuscipes streator Merriam, Proc. Biol. Soc. Wash., IX., p. 124, July 2, 1894. Carbondale, Amador Co., California.

Neotoma fuscipes dispar Merriam, *ibid.*, p. 124. Lone Pine, Owens Valley California.

Neotoma monochrourea Rhoads, Am. Nat., XXVIII., Jan., 1894, p. 67 Josephine Co., Oregon.

Dr. Merriam has also described a new genus, from the State of Colima, Mexico, allied to *Neotoma*, under the name *Xenomys*.¹

The Cotton Rats (genus *Sigmodon*) have been increased from 1 species to 2 species and 4 subspecies, the genus now consisting of two quite distinct groups, represented respectively by *S. hispidus* and *S. fulviventer*.²

Neotoma californica Price, Proc. Cal. Acad. Sci. (2), IV., p. 154, pl. xi., skull, May 9, 1894. Bear Valley, San Benito Co., Cal.

Neotoma splendens True, Proc. U. S. Nat. Mus., XVII., No. 1,006, p. —, (advance sheet, p. 1, June 27, 1894). Marin Co., California.

Neotoma venusta True, *ibid.*, p. 2. Carrizo Creek, California.

Neotoma macrotis Thomas, Ann. and Mag. Nat. Hist. (6), XII., p. 234, Sept., 1893. San Diego, Cal.

Neotoma macrotis simplex True, Proc. U. S. Nat. Mus., XVII., No. 1,006, p. —, (advance sheet, p. 2, June 27, 1894). Fort Tejon, California.

Neotoma intermedia Rhoads, Am. Nat., XXVIII., Jan., 1894, p. 69. San Diego Co., Cal.

Neotoma intermedia gilva Rhoads, *ibid.*, p. 70. Banning and San Bernardino, Cal.

Neotoma intermedia melanura Merriam, Proc. Biol. Soc. Wash., IX., p. 126, July 2, 1894. Ortiz, Sonora, Mexico.

Neotoma intermedia angusticeps Merriam, *ibid.*, p. 127. Southwest corner of Grant Co., New Mexico.

Neotoma pinetorum Merriam, Proc. Biol. Soc. Wash., VIII., p. 111, July, 1893. San Francisco Mountains, Arizona.

Neotoma ferruginea Tomes.

Neotoma torquata Ward, Am. Nat., Feb., 1891, p. 160. State of Morelos, Mexico.

Neotoma alleni Merriam, Proc. Biol. Soc. Wash., VII., p. 168, Sept., 1892. Manzanillo, Colima, Mexico.

Neotoma tenuicauda Merriam, *ibid.*, p. 169. Sierra Nevada de Colima, Jalisco, Mexico.

¹ Proc. Biol. Soc. Wash., VII., pp. 159-163, Sept., 1892. Type *X. nelsoni*, sp. nov.

² *Sigmodon hispidus* Say & Ord. Southeastern United States.

Sigmodon hispidus littoralis Chapman, Bull. Am. Mus. Nat. Hist., II., p. 118, June, 1889. Southern Florida.

Sigmodon hispidus texianus (Aud. & Bach.). Revived by Allen, *ibid.*, III, p. 287, June, 1890. Texas.

In 1884 the genus *Oryzomys* was ranked as a subgenus of "*Hesperomys*," with 2 species, one of which was the Rice-field Mouse (*O. palustris*) of the Southern States, and the other a Mexican and Central American species (*O. couesi*). The number has since been increased by the addition of one species and two subspecies from the United States, and 6 species from Mexico and Central America.¹

The Grasshopper Mice, genus *Onychomys*, likewise merged in *Hesperomys* in 1884, and numbering only 2 species, now stands as a full genus with 8 species and 1 subspecies.²

Sigmodon hispidus toltecus (De Saussure). Revived by Allen, *ibid.*, p. 207, Southern Mexico, South to Costa Rica.

Sigmodon hispidus arizonæ Mearns, *ibid.*, II., p. 287, Feb., 1890. Fort Verde, Arizona.

Sigmodon fulviventer Allen, *ibid.*, II., p. 180, Oct., 1889. Zacatecas, Mexico.

¹ *Oryzomys palustris* (Harlan). South Atlantic States.

Oryzomys palustris natator Chapman, Bull. Am. Mus. Nat. Hist., V., p. 44, March, 1893. Florida and Gulf Coast.

Oryzomys palustris texensis Allen, *ibid.*, VI., p. 177, May, 1894. Coast of Texas.

Oryzomys aquaticus Allen, *ibid.*, III., p. 289, June, 1891. Cameron Co. Texas.

Oryzomys talamanca Allen, Proc. U. S. Nat. Mus., XIV., 1891, p. 193. Costa Rica.

Oryzomys alfaroi Allen, Bull. Am. Mus. Nat. Hist., III., p. 214, April, 1891. Costa Rica.

Oryzomys costaricensis Allen, *ibid.*, V., p. 239, Sept., 1893. Costa Rica.

Oryzomys couesi (Alston). See Thomas, Ann. and Mag. Nat. Hist. (6), XI., 1893, p. 403.

Oryzomys fulgens Thomas, *ibid.*, p. 403, Mexico.

Oryzomys melanotis Thomas, *ibid.*, p. 404. Mineral San Sebastian, Jalisco, Mexico.

² *Onychomys leucogaster* (Wied). Upper Missouri.

Onychomys leucogaster brevicaudus Merriam, N. Am. Fauna, No. 5, p. 52 July, 1891. Idaho.

Onychomys longipes Merriam, *ibid.*, No. 2, p. 1, Oct., 1889, Texas.

Onychomys longicaudus Merriam, *ibid.*, p. 2. St. George, Utah.

Onychomys melanophrys Merriam, *ibid.*, p. 2, and No. 3, pp. 61, 62. Kanab, Utah.

The very numerous group of Deer Mice, or White-footed Mice, forming the restricted genus *Sitomys* (= subgenus *Vesperimus* Coues), has of late received a large share of attention, both from collectors and systematists. In 1884 probably the specimens in the museums did not exceed 700 or 800, of which only a small part would now be considered as available, or at least desirable, for scientific use, while now probably 7,000 to 10,000 could be brought together if the specimens in the various public and private collections in this country should be combined. The number of forms recognized in this particular group of mice in 1884 was 9—6 species and 3 subspecies. The number now recorded is 37—21 species and 16 subspecies; an increase of about 300 per cent. in seven years.¹ I am more

Onychomys melanophrys pallescens Merriam, *ibid.*, No. 3, p. 61, Sept., 1890. Apache Co., Arizona.

Onychomys fuliginosus Merriam, *ibid.*, p. 59, Oct., 1890. Arizona.

Onychomys ramona Rhoads, *Am. Nat.*, Sept., 1893, p. 833. San Bernardino Valley, Cal.

Onychomys torridus (Coues). Arizona.

¹ The United States additions made prior to October, 1892, may be found recorded in detail by Bryant in *Zoe*, III., pp. 212—214. Mexican and later additions are included in the following full list:

a. UNITED STATES.

Sitomys americanus (Kerr).

Sitomys americanus canadensis Miller, *Proc. Biol. Soc. Wash.*, VIII., p. 55, June, 1893. Northern New England, northern New York, and northward.

Sitomys americanus gossypinus (Le Conte).

Sitomys americanus arcticus (Mearns).

Sitomys americanus nebracensis (Baird).

Sitomys americanus texanus (Woodhouse).

Sitomys americanus rufinus (Merriam).

Sitomys americanus austerus (Baird).

Sitomys americanus gambeli (Baird). Revived by Allen, *Bull. Am. Mus. Nat. Hist.*, V., 1893, p. 190.

Sitomys americanus deserticolus (Mearns).

Sitomys americanus sonoriensis (Le Conte).

Sitomys americanus thurberi Allen, *Bull. Am. Mus. Nat. Hist.*, V., p. 185, August, 1893. Northern Lower California.

or less familiar with all but three or four, and consider that very few of them are not well founded ; while I am cogni-

Sitomys mearnsii (Allen).

Sitomys boylii (Baird).

Sitomys auripectus Allen, Bull. Am. Mus. Nat. Hist., V., p. 75, April, 1893. San Juan region of Utah, Colorado, New Mexico, and Arizona.

Sitomys rowleyi Allen, *ibid.*, p. 76. Southeastern Utah and adjoining portions of Colorado, New Mexico, and Arizona.

Sitomys rowleyi pinalis Miller, *ibid.*, p. 331, Dec., 1893. Grant County, New Mexico, and Pinal County, Arizona.

Sitomys fraterculus Miller.

Sitomys eremicus (Baird).

Sitomys major Rhoads, Am. Nat., Sept., 1893, p. 831. San Bernardino Co., Cal.

Sitomys herroni Rhoads, *ibid.*, p. 832. San Bernardino Valley, Cal.

Sitomys californicus (Gambel).

Sitomys gilberti Allen, Bull. Am. Mus. Nat. Hist., V., p. 188, Aug., 1893. San Benito Co., Cal.

Sitomys martirensis Allen, *ibid.*, p. 187. San Pedro Martir Mountains, Lower California.

Sitomys robustus Allen, *ibid.*, p. 335, Dec., 1893. Lake Co., California.

Sitomys floridanus (Chapman).

Sitomys macropus (Merriam).

Sitomys truei (Shufeldt).

Sitomys truei megalotis (Merriam).

Sitomys truei nasutus (Allen).

Sitomys truei crinitus (Merriam).

Sitomys aureolus (Aud. & Bach.).

Sitomys michiganensis (Aud. & Bach.).

Sitomys anthonyi (Merriam).

Sitomys taylori (Thomas).

Sitomys niveiventris (Chapman).

Sitomys niveiventris subgriseus Chapman, Bull. Am. Mus. Nat. Hist., V., p. 340, Dec., 1893. Florida.

b. MEXICO AND CENTRAL AMERICA.

Sitomys aztecus (De Saussure).

Sitomys melanophrys (Coues).

Sitomys difficilis (Allen) = *Vesperimus difficilis* Allen, Bull. Am. Mus. Nat. Hist., III., p. 298, June, 1891. Sierra de Valparaiso, Zacatecas, Mexico.

Sitomys musculus Merriam, Proc. Biol. Soc. Wash., VII., p. 170, Sept., 1892. Colima and Jalisco, Mexico.

Sitomys cherriei Allen = *Hesperomys (Vesperimus) cherriei* Allen, Bull. Am. Mus. Nat. Hist., III., p. 211, April, 1891. Costa Rica.

Sitomys nudipes Allen = *Hesperomys (Vesperimus) nudipes* Allen, *ibid.*, p. 213, and V., 1893, p. 239. Costa Rica.

zant of quite a number of still undescribed forms entitled to recognition in nomenclature. Five admitted by Baird in 1857, but later reduced to synonyms, have been reinstated as subspecies. The group is divisible into several sections or subgenera, one of which (as already noticed) has already been characterized by Mr. True (see *antea*, p. 31). Neither this nor some of the other leading types of this group were represented in our leading museums by a single specimen prior to 1885. They were thus not overlooked by previous workers, but are genuine discoveries of the present decade.

The Sciuridæ, or the Squirrels, *Spermophiles* and their allies, present a nearly parallel case with the Muridæ, but only the genera *Sciurus*, *Tamias* and *Spermophilus* can be noticed in the present connection.

Of the genus *Sciurus* there were recognized in 1884, 13 species and 7 subspecies; in 1894, 18 species and 16 subspecies.¹

¹ The additions from the United States are :

Sciurus hudsonius mogollonensis Mearns.

Sciurus hudsonius vancouverensis Allen.

Sciurus hudsonius californicus Allen. (Perhaps = *Sciurus botte* Less., 1832.)

Sciurus carolinensis hypophæus Merriam.

Sciurus niger limitis (Baird). Revived by Allen, Bull. Am. Mus. Nat. Hist., VI., p. 183, May, 1894.

Sciurus fossor nigripes Bryant.

Sciurus aberti concolor True, Proc. U. S. Nat. Mus., XVII., No. 999, (advance sheet), April 26, 1894. Larimer Co., Colorado.

Mexican and Central American additions are :

Sciurus niger melanonotus Thomas, P. Z. S., 1890, p. 73, pl. vi. Jalapa, Mexico.

Sciurus apache Allen, Bull. Am. Mus. Nat. Hist., V., p. 29, March, 1893. Northern Chihuahua, Mexico.

Sciurus aberti durangi Thomas, Ann. & Mag. Nat. Hist., (6) XI., p. 50, Jan., 1893. Cuidad, Durango, Mexico.

Sciurus nayarithensis Allen, Bull. Am. Mus. Nat. Hist., III., p. vii., Feb., 1890 = *S. alstoni* Allen (nec Anderson). *ibid.*, II., p. 167, Oct., 1889. Zacatecas Mexico.

Sciurus cervicalis Allen, *ibid.*, p. 183. Sierra Nevada de Colima, Jalisco, Mexico.

In 1884 the genus *Tamias*, as recorded in Mr. True's List, contained 4 species and 4 additional subspecies; in 1894 (taking *Tamias* as limited in 1884), the recognized forms number 21 species and 12 subspecies.

The species in the 1884 list were (1) the common Eastern Chipmunk (*Tamias striatus*) which has since been separated into three subspecies; (2) Say's Chipmunk (*T. lateralis*), ranging from the Rocky Mountains westward, in suitable localities, to the Pacific coast. This now consists of a group of three species and several additional subspecies. (3) Harris's Chipmunk (*T. harrissi*), more southern in distribution than the last, now stands as a group of 4 species and 2 subspecies. (4) The Four-lined or Rocky Mountain Chipmunk (*T. quadrivittatus*), with 4 subspecies, now stands as a group of 23 species and 16 subspecies, under several subgeneric subdivisions.¹

Sciurus leucops (Gray). Revived by Allen, *ibid.*, p. 166, and III., p. 182.

Sciurus nelsoni Merriam, Proc. Biol. Soc. Wash., VIII., p. 144, Dec., 1893. Morelos, Mexico.

¹ Following is the list as at present recognized (for full reference to additions made prior to October, 1892, see Bryant, as before):

| | |
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| <i>Tamias striatus</i> (Linn.). | <i>Tamias frater</i> Allen. |
| <i>Tamias striatus lysteri</i> (Rich.). | <i>Tamias minimus</i> (Bach.). |
| <i>Tamias striatus griseus</i> Mearns. | <i>Tamias minimus consobrinus</i> Allen. |
| <i>Tamias quadrivittatus</i> (Say). | <i>Tamias minimus pictus</i> Allen. |
| <i>Tamias quadrivittatus neglectus</i> Allen. | <i>Tamias amoenus</i> Allen. |
| <i>Tamias quadrivittatus gracilis</i> Allen. | <i>Tamias cinereicollis</i> Allen. |
| <i>Tamias quadrivittatus luteiventris</i> Allen. | <i>Tamias umbrinus</i> Allen. |
| <i>Tamias quadrivittatus affinis</i> Allen. | <i>Tamias speciosus</i> Merriam. |
| <i>Tamias quadrivittatus borealis</i> Allen. | <i>Tamias townsendii</i> Bachm. |
| <i>Tamias merriami</i> Allen. | <i>Tamias townsendii hindsii</i> (Gray). |
| <i>Tamias obscurus</i> Allen (ex Townsend MS.). | <i>Tamias quadrimaculatus</i> (Gray). |
| <i>Tamias senex</i> Allen. | <i>Tamias macrorhabdotes</i> Merriam. |

Tamias panamintinus Merriam, Proc. Biol. Soc., VIII., p. 134, Dec., 1893.

Tamias callipeplus Merriam, *ibid.*, p. 136.

Tamias alpinus Merriam, *ibid.*, p. 137.

Tamias bulleri Allen, Bull. Am. Mus. Nat. Hist., III., p. 92 = *T. asiaticus bulleri* Allen, *ibid.*, II., p. 173.

Tamias dorsalis Baird.

Tamias lateralis (Say).

The genus *Spermophilus* was credited in the 1884 List with 11 species and 6 subspecies; it now contains 20 species and 13 subspecies.¹

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- Tamias castanurus* Merriam, N. Am. Fauna, No. 4, p. 19, Oct., 1890.
Tamias canerascens Merriam, *ibid*, p. 20.
Tamias chrysodeirus Merriam, *ibid.*, p. 19.
Tamias chrysodeirus brevicaudus (Merriam) = *Spermophilus chrysodeirus brevicaudus* Merriam, Proc. Biol. Soc. Wash., VIII., p. 134, Dec., 1893.
Tamias harrisi (Aud. & Bach.).
Tamias leucurus Merriam, N. Am. Fauna, No. 2, p. 20, Oct., 1889.
Tamias leucurus cinnamomeus Merriam, *ibid.*, No. 3, p. 51, Sept., 1890.
Tamias leucurus peninsulæ Allen, Bull. Am. Mus. Nat. Hist., V., p. 197, Aug., 1893.
Tamias nelsoni (Merriam) = *Spermophilus nelsoni* Merriam, Proc. Biol. Soc. Wash., VIII., p. 129, Dec., 1893.
- ¹ *Spermophilus grammurus* (Say).
Spermophilus grammurus douglasii (Rich.).
Spermophilus grammurus beecheyi (Rich.).
Spermophilus grammurus atricapillus Bryant, Proc. Cal. Acad. Sci., (2), II., p. 26, June 20, 1889.
Spermophilus grammurus macrourus (Bennett). Revived by Allen, Bull. Am. Mus. Nat. Hist., II., 1889, p. 170. Zapotlan, Jalisco, Mexico.
Spermophilus grammurus fisheri (Merriam) = *Spermophilus beecheyi fisheri* Merriam, Proc. Biol. Soc. Wash., VIII., p. 133, Dec., 1893.
Spermophilus empetra (Pallas).
Spermophilus empetra kodiacensis Allen.
Spermophilus empetra columbianus (Ord) = *Spermophilus columbianus* Merriam, N. Am. Fauna, No. 5, p. 39, July, 1891.
Spermophilus richardsoni (Sabine).
Spermophilus townsendi Bachman.
Spermophilus elegans Kennicott.
Spermophilus armatus Kennicott.
Spermophilus beldingi Merriam.
Spermophilus perotensis Merriam, Proc. Biol. Soc. Wash., VIII., p. 131, Dec., 1893.
Spermophilus obsoletus Kennicott.
Spermophilus spilosoma Bennett.
Spermophilus spilosoma macropsilotus Merriam.
Spermophilus spilosoma major Merriam.
Spermophilus spilosoma pratensis Merriam.
Spermophilus spilosoma obsidianus Merriam.
Spermophilus spilosoma annectens Merriam, Proc. Biol. Soc. Wash., VIII., p. 132, Dec., 1893.
Spermophilus cryptospilotus Merriam.

Besides the additions above indicated to the genera *Sciurus*, *Tamias*, and *Spermophilus*, each of these genera is considered as separable into several subgenera, most of which, however, were proposed prior to 1884. Thus Trouessart,¹ in 1880, proposed to divide the North American species of *Sciurus* into (1) *Neosciurus* (type, *S. carolinensis*), (2) *Parasciurus* (type, *S. niger*), and (3) *Tamiasciurus* (type, *S. hudsonius*). *Tamias* was divided by the same author into (1) *Tamias* (type, *T. striatus*), and (2) *Eutamias* (type, *T. asiaticus*), to which Dr. Merriam² has added *Ammospermophilus* (type, *T. lucurus*), and has transferred this group to the genus *Spermophilus*. To the four previously recognized subgenera of *Spermophilus* Dr. Merriam has added³ also *Xerospermophilus* (type, *S. mohavensis*).

In respect to the other genera of the Scuridæ, additions have been made also to both *Arctomys* and *Cynomys*, with radical changes in the nomenclature of some of the species of the latter.

There have likewise been numerous additions among the Bats and Shrews, and also among the Carnivores, particularly in the case of the Skunks of the genus *Spilogale*. This group stood in 1884 as a subgenus of *Mephitis*, with 1 species; it now ranks as a genus,³ with 8 species and 2 additional subspecies.

Spermophilus canescens Merriam.

Spermophilus sonoriensis Ward, Am. Nat., Feb., 1891, p. 158. Hermosillo, Sonora, Mexico.

Spermophilus tereticaudus Baird.

Spermophilus mohavensis Merriam.

Spermophilus neglectus Merriam.

Spermophilus mexicanus (Licht.).

Spermophilus tridecemlineatus (Mitchell).

Spermophilus tridecemlineatus pallidus Allen.

Spermophilus franklini (Sabine).

Spermophilus annulatus (Aud. & Bach.).

¹ Bull. Soc. d'Études Scientif. d'Angers, 1888, pp. 76-81 and 86.

² Proc. Biol. Soc. Wash., VII., p. 27, April, 1892.

³ Cf. Merriam, N. Am. Fauna, No. 4, pp. 1-15, Oct., 1890.

As already said, the work here under notice is recognized as tentative. As additional material is acquired, and the various groups are taken up monographically, probably some of the recently described forms will be found to have been too hastily recognized in nomenclature, and that others now ranked as species will have to take the status of subspecies. On the other hand, it is quite certain that there still remain many new forms to be described, even among some of the groups to which so many additions have already been made.

In many groups of our mammals little has been done as yet beyond the description of a few new forms. Especially is this the case with nearly all of the genera of the Carnivores, the Shrews and Moles. Some preliminary work has recently been done on the latter by Mr. True, who has in hand a monograph of the group.¹ The Shrews present a most difficult and interesting group, where at present it is almost impossible to properly allocate the names already given, or to form even a surmise as to the number of species and their relationships. The Bats have fortunately been brought into comparative order through the labors of Dr. Harrison Allen, whose recent monograph of the subject² is a valuable contribution to our knowledge of their anatomy, relationships, and proper nomenclature. Thus

¹To the Moles have recently been added 1 new genus, 3 new species, and 1 new subspecies, as follows :

Parascalops, gen. nov., True, Proc. U. S. Nat. Mus., XVII., 1894, (advance sheet, April 26, 1894). Type, *Scalops breweri* Bachman.

Scapanus dilatus True, *ibid.* Fort Klamath, Oregon.

Scapanus anthonyi Allen, Bull. Am. Mus. Nat. Hist., V., p. 200, Aug., 1893. San Pedro Martir, Lower California.

Scalops texanus Allen, *ibid.*, III., 1891, p. 221, and V., p. 200. Texas.

Scalops aquaticus australis Chapman, *ibid.*, V., p. 339, Dec., 1893. Florida.

Scalops parvus Rhoads, Proc. Acad. Nat. Sci. Phila., 1894, p. 157. Tarpon Springs, Florida.

²A Monograph of the Bats of North America. By Harrison Allen, M.D.,= Bulletin of the U. S. Nat. Mus., No. 43. 8vo., pp. i-ix., 1-198, pll. i-xxxviii., 1893 (March, 1894).

although so much has been done during the last five years, the published results form but a beginning toward a proper knowledge of the mammalian fauna of North America.

Thus far in this paper reference has been made mainly to the discovery of new forms as evidence of the recent advances in our knowledge of North American mammals, and little in respect to increase in knowledge along other lines, or of particular geographical areas. Most of the new forms have of course come from the little known parts of the West, and from countries south of the United States, where collecting had been exceedingly superficial and sporadic, the material previously gathered being such as chance threw in the way of comparatively untrained collectors. Less than a decade ago the more unsettled parts of the West, and especially the extensive arid regions, were practically virgin ground, so far as the systematic trapping of small mammals was concerned. Now there are few areas of any great extent that have not been visited by trained collectors with the best modern devices for capturing small mammals; while considerable portions of the country have been methodically explored, with a view not merely to securing large series of specimens from certain selected localities for comparative study, but especially for the purpose of determining the geographical distribution of particular forms or groups of forms, as regards both their vertical and horizontal range. In the western and southwestern portions of the United States many thousands of square miles have been systematically surveyed biologically under the direction of Dr. C. Hart Merriam,¹ Chief of the Division of Ornithology and Mammalogy, United States Department of Agriculture, who for the last five years has been able to keep in the field a large corps of skilled collectors. Under the same auspices much collecting has been done also in the East and South,

¹ See *N. Am. Fauna*, Nos. 3, 4, 5 and 7, for reports on his explorations in Arizona, Idaho, and southwestern California and contiguous regions.

and in northern and central Mexico. Thousands upon thousands of specimens have also been secured by independent collectors, which have found their way either into various private collections or into public museums.¹

This material has of course all been subjected to preliminary examination, and most of the novelties made known, but for the important results that must follow from its careful elaboration we must still wait. Various faunal papers—far too numerous for enumeration in the present connection—have also been published. New workers are also every year entering the field; so that the outlook for the further progress of North American mammalogy is full of encouragement.

¹ For example, during the last four or five years some 6,000 specimens of North American Mammals have been acquired by the American Museum of Natural History in New York City.

A CONSIDERATION OF SOME ORNITHOLOGICAL LITERATURE, WITH EXTRACTS FROM CURRENT CRITICISM.

I. 1876 TO 1883.
II. 1884 TO 1893.

BY L. S. FOSTER.

1876 to 1883.

Under the heading, "Recent Literature," in the volumes of the Bulletin of the Nuttall Ornithological Club, published from 1876 to 1883, are reviews of numerous publications which, I hold, pretty fairly represent the ornithological literature of this important period, particularly so far as North America is concerned.

A hasty survey of this literature might, perchance, convey the idea of individual effort rather than combined exertion, but, summarized, it shows an advanced movement along a series of lines which, at the close of the period, interlaced and formed the firm foundation upon which has been erected the solid superstructure of The American Ornithologists' Union.

The more prominent features of the time and those which will permanently characterize it, seem to be as follows :

The appearance of the first volume of the Catalogue of the Birds in the British Museum ;

The revisionary work of Mr. Ridgway and Dr. Stejneger on certain orders and genera ;

The organization of The Linnæan Society of New York, together with the publication of the first volume of its Transactions ;

The publication of *Biologia Centrali-Americana* ;

The appearance of Mr. George N. Lawrence's "General Catalogue of the Birds noted from the Islands of the Lesser Antilles" ; Stearns and Coues's "New England Bird Life" ; Dr. Merriam's "Review of the Birds of Connecticut" ; Dr. Wheaton's "Report on the Birds of Ohio" ; Dr. Coues's series of four bibliographical papers and his check-list of 1882 ; Mr. Ridgway's nomenclature of 1881 ; and the beginning of John Burroughs's charming series of out-of-door books with the republication of "Wake-Robin" in 1877.

In clearing the way for the A. O. U. check-list, the work on nomenclature which was done by Mr. Ridgway and Dr. Stejneger was not only necessary but eminently workman-like. In these years, the battle for trinomialism in North America was fought and gallantly won.

Especially will this period be notable as the epoch in which serious work was begun in recording facts of migrations ; the Germans, the English, and, in this country, Prof. W. W. Cooke, accomplished much.

[The continuation of this paper, as read, consisted of numerous examples of the criticisms which follow :]

TITLES AND CRITICISMS OF SOME ORNITHOLOGICAL LITERATURE,

I.

1876 TO 1883.

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1876.

COOPER, J. G.—New Facts relating to Californian Ornithology. No. 1.

By Dr. J. G. Cooper. *Proc. Cal. Acad. Sci.*, 1876. 14 pages.

....About fifty species are noticed....The paper is replete with interesting matter, and forms a valuable contribution to our knowledge of Californian Ornithology.--J. A. A., *Bull. Nutt. Ornith. Club*, Vol. II., p. 76, July, 1877.

D'HAMONVILLE, J. C. L. T.—Catalogue des Oiseaux d'Europe, ou énumération des espèces et races d'oiseaux dont la présence, soit habituelle soit fortuite, a été dûment constatée dans les limites géographiques de l'Europe, par J. C. L. T. D'Hamonville. 8vo., pp. 74. Paris, 1876.

....deserves more than a mere mention on account of the admirably comprehensive manner in which it has been prepared. the Baron makes the whole number 658,....—T. M. B., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 106, 107, October, 1877.

GARROD, A. H.—On some Anatomical Characters which bear upon the Major Divisions of the Passerine Birds. By A. H. Garrod. *Proc. Zool. Soc. London*, 1876.

....He concludes his paper with a tabular arrangement of the larger groups of the Passeres, expressive of his views of their affinities. —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. II., p. 23, January, 1877.

GENTRY, THOMAS G.—Life-Histories of the Birds of Eastern Pennsylvania. By Thomas G. Gentry. (In two volumes.) Vol. I: Philadelphia, 1876. 12 mo., pp. xvi., 309.

....a most welcome volume of biographies of the birds of Eastern North America....The author's style is unostentatious and simple, at times lapsing into carelessness...The present volume includes the Song-birds as far as the Corvidæ of Dr. Coes's arrangement...—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., pp. 49, 50, July, 1876.

HENSHAW, H. W.—Annual Report upon the Geographical Surveys West of the One-Hundredth Meridian, etc. By George M. Wheeler, First Lieutenant of Engineers, U. S. A. Being Appendix JJ of the Annual Report of the Chief of Engineers for 1876. Washington: Government Printing Office, 1876. Report on the Ornithology of the Portions of California visited during the Field Season of 1875. By Mr. H. W. Henshaw. Pp. 224-278.

....Among the more important results are the extension, either southward or westward, of the previously recorded range of many species of birds....The biographical annotations are often full and always exceedingly interesting...—W. B., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 136, 137, July, 1878.

JORDAN, DAVID STARR.—Manual of the Vertebrates of the Northern United States, including the District east of the Mississippi River, and north of North Carolina and Tennessee, exclusive of Marine Species. By David Starr Jordan, M.S., M.D., etc. Chicago, 1876. 12mo., pp. 342.

....Several of the analytical tables of different groups of birds are based on or taken directly from Coes's Key, and the latest and best authorities are followed for the other classes....On the whole the author is to be congratulated on the success he has achieved in this difficult undertaking, combining in a work of convenient size and moderate

cost a text-book of the Vertebrate Animals of the Northeastern States reliable in character and sufficiently extended to guide the student with tolerable ease to the name of any species he may chance to have in hand.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., pp. 93, 94, November, 1876.

KIDDER, J. H.—Contributions to the Natural History of Kerguelen Island. By J. H. Kidder, M.D. Edited by Dr. Elliott Coues, U. S. A. II. Oölogy, pp. 6-20. *Bull. U. S. Nat. Mus.*, No. 3. Washington, 1876.

....an account of the Oölogy of the island, including detailed descriptions and measurements of the eggs, together with an account of the breeding habits of all the species found breeding there....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., p. 48, July, 1876.

KIDDER, J. H.—Contributions to the Natural History of Kerguelen Island. By J. H. Kidder, M.D. Edited by Dr. Elliott Coues, U. S. A. II., pp. 85-116. A Study of *Chionis minor*. *Bull. U. S. Nat. Mus.*, No. 3. Washington, 1876.

This essay opens with a résumé of the literature of the species ... Then follows a description of its anatomy, including an account of its myology, of the viscera and the skeleton ; of its habits, general appearance in life, and external characters....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., pp. 48, 49, July, 1876.

LAWRENCE, GEORGE N.—Description of a New Species of Jay of the Genus *Cyanocitta* ; also of a supposed New Species of *Cyanocorax*. By George N. Lawrence. *Annals of the Lyceum of Nat. Hist. N. Y.*, Vol. XI., pp. 163-165. [Published Feb., 1873.]

....(*Cyanocitta pulchra*) being from Ecuador and the other (*Cyanocorax ortoni*) from Northern Peru. — J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., p. 47, July, 1876.

LAWRENCE, GEORGE N.—Birds of Southwestern Mexico collected by Francis E. Sumichrast. Prepared by George N. Lawrence. *Bull. U. S. Nat. Mus.*, No. 4. Washington, 1876.

....The list embraces three hundred and twenty-one species, with valuable and occasionally quite copious field-notes by the collector ... —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., p. 93, November, 1876.

MARSH, O. C. —Extinct Birds with Teeth. By Professor O. C. Marsh. *Am. Jour. Sci. and Arts*, June, 1876, pp. 509-511.

These interesting forms ... combine in a peculiar manner many reptilian characters with others truly avian.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. I., p. 49, July, 1876.

RIDGWAY, ROBERT.—Second Thoughts on the Genus *Micrastur*. By Robert Ridgway. *The Ibis*, 1876, pp. 1-5.

RIDGWAY, ROBERT.—Studies of the American Falconidæ : Monograph

of the Polybori. By Robert Ridgway. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. I., No. 6, pp. 451-473, plates xxii.-xxvii., February 8, 1876.

RIDGWAY, ROBERT.—Studies of the American Falconidæ. By Robert Ridgway. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. II., No. 2, pp. 91-182, plates xxxi., xxxii., April 1, 1876.

SAUNDERS, HOWARD.—On the Stercorariinæ or Skua Gulls. By Howard Saunders, F.L.S. &c. *Proc. Zool. Soc. London*, 1876, pp. 317-332, pl. xxiv.

Mr. Saunders recognizes six species, all of which he refers to one genus for which he adopts the name *Stercorarius*. . . .—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 23, 24, January, 1877.

SAUNDERS, HOWARD.—On the Sterninæ, or Terns, with Descriptions of three new Species. By Howard Saunders, F.L.S., F.Z.S. *Proc. Zool. Soc. London*, 1876, pp. 638-672, pl. lxi.

. . . .Of the forty-eight species recognized, thirty-eight are placed under *Sterna*. . . .—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. II., p. 24, January, 1877.

. . . .We have here in condensed and convenient shape the main results of a protracted study, representing much laborious and faithful application; the author has evidently worked with care, and fully availed himself of the unusual facilities he has enjoyed. . . .I regard the paper as the most authoritative one we possess on this subject. . . .The colored plate illustrates the heads of three species of *Anous*. . . .—Elliott Coues, *Bull. Nutt. Ornith. Club*, Vol. III., pp. 140-144, July, 1878.

SLATER, P. L. and SALVIN, OSBERT.—On new Species of Bolivian Birds. By P. L. Slater, M.A., Ph.D., F.R.S., and Osbert Salvin, M.A., F.R.S. *Proc. Zool. Soc. London*, 1876, pp. 352-358, pll. xxx-xxxiii.

SLATER, P. L. and SALVIN, OSBERT.—Revision of the Neotropical Anatidæ. By P. L. Slater and O. Salvin. *Proc. Zool. Soc. London*, 1876, pp. 358-412, pl. xxxiv.

. . . .a most valuable synopsis of the Ducks and Geese of Middle and Southern America, and embraces also a large proportion of the species of North America, including as it does all that reach Tropical America in their migrations. . . .The paper closes with a very convenient tabular synopsis of the geographical distribution of the genera and species. —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. II., p. 24, January, 1877.

VENNOR, HENRY G.—Our Birds of Prey; or the Eagles, Hawks, and Owls of Canada. By Henry G. Vennor, F.G.S. Of the Geological Survey of Canada. With 30 Photographic Illustrations by Wm. Notman. Montreal: Published by Dawson Brothers. 1876. 4to., pp. i-viii and 1-154, 30 mounted photographs of birds.

. . . .The text, which is largely compiled from the notes of other

writers, gives a fairly digested summary of the individual history of each species ...—T. M. B., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 24, 25, January, 1877.

1877.

BARROWS, W. B.—Catalogue of the Alcidae contained in Museum of the Boston Society of Natural History, with a review and proposed classification of the Family. By W. B. Barrows. *Proc. Boston Soc. Nat. Hist.*, Vol. XIX., pp. 150–165. November, 1877.

....The true affinities of the species he (Mr. Barrows) believes can only be determined by a thorough study of their embryological development. The character of this paper indicates that in Mr. Barrows we have a valuable accession to our corps of ornithological students.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 86, April, 1878.

BENDIRE, CHARLES E.—Notes on some of the Birds found in South-eastern Oregon, particularly in the Vicinity of Camp Harney, from November, 1874, to January, 1877. By Captain Charles Bendire, U. S. Army. *Proc. Boston Soc. Nat. Hist.*, Vol. XIX., pp. 109–149, Nov., 1877.

....a list embracing one hundred and ninety-one species and varieties... Aside from some former notes by the same author....we have here our first detailed information respecting the ornithology of the immediate region under consideration....The list is enriched with copious biographical notes, including descriptions of the breeding-habits, nests, and eggs of a large number of the less well-known species, and forms a most important contribution to the ornithology of the West.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 81, April, 1878.

BURROUGHS, JOHN.—Wake-Robin. By John Burroughs. Second Edition, corrected, enlarged and illustrated (cut). New York: Published by Hurd and Houghton. Cambridge: The Riverside Press, 1877, 16mo., pp. 1–256, frontispiece and wood cuts.

Hurd and Houghton have reprinted Mr. John Burroughs's charming little volume "Wake-Robin," wherein the wild wood-life of the birds, from Washington to the Adirondacks is picturesquely sketched. Mr. Burroughs has a keen eye and a loving heart towards the birds—E. L., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 48, 49, April, 1877.

ELLIOT, D. G.—Review of the Ibirdinæ, or Subfamily of the Ibises. By D. G. Elliot, F.R.S.E., F.L.S., etc., etc. *Proc. Zoöl. Soc. London*, 1877, pp. 477–510, pl. li.

....Mr. Elliot treats the Ibises and Spoonbills as subfamilies of one family, for which he adopts the name *Ibirdidæ*. After a short *résumé* of the literature of the subject he gives a key to the nineteen genera (three being new), among which he distributes his twenty-five species. Then follows a systematic review of the species, with their principal synonymy, and various critical and descriptive remarks, with generally a short account of their habits and geographical distribution....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 182, October, 1878.

FEILDEN, H. W.—List of Birds observed in Smith Sound, and in the Polar Basin during the Arctic Expedition of 1875-76. By H. W. Feilden. *The Ibis*, Fourth Series, Vol. I., pp. 401-412, October, 1877.

...enumerates twenty-four species observed.... "in Smith Sound and northward between the seventy-eighth and eighty-third degrees of north latitude,".... The quite detailed notes respecting the species of this list render it a paper of unusual interest.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 86, April, 1878.

GENTRY, THOMAS G.—Life-Histories of the Birds of Eastern Pennsylvania. By Thomas G. Gentry. Vol. II., 8vo., pp. 336. The Naturalist's Agency, Salem, Mass., 1877.

...It abounds in original observations, combined with much that is gleaned from other authors.... Despite some faults of execution, the work before us contributes much of value respecting the habits of our birds, and records many interesting points in their history not given by previous writers.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 36, 37, January, 1878.

HARVIE BROWN, J. A.—On the Distribution of Birds in North Russia. Part I. On the Distribution of Birds of the Lower Petchora, in Northeast Russia. Part II. Longitudinal Distribution of Species North of $64^{\circ} 30'$ N. lat., or the Northern Division. Part III. On the Longitudinal Distribution of the Birds of the Southern Division (between $64\frac{1}{2}^{\circ}$ N. and 58° - 60° N.). By J. A. Harvie-Brown. *Annals and Magazine of Natural History*, April, July, and September, 1877.

...By means of a system of symbols the range of each of the two hundred and eighty-one positively identified or authentic species is given in tables, in such a way as to indicate the abundance or scarcity of the species in each of the several districts... It is good work in a most important direction.... The number of circumpolar species (nearly fifty) embraced in these lists render these papers of special interest to students who commonly confine their attention to the birds of the North American Region.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 35, 36, January, 1878.

HENSHAW, H. W.—Annual Report upon the Geographical Surveys West of the One-Hundredth Meridian, etc. By George M. Wheeler, First Lieutenant of Engineers, U. S. A. Being Appendix NN of the Annual Report of Engineers for 1877. Washington: Government Printing-Office, 1877. Report on the Ornithology of Portions of Nevada and California. By Mr. H. W. Henshaw. Pp. 1303-1322.

...following is a systematic and very able consideration of the faunal provinces of the United States.... The full results of the season's work are given in two detailed lists, entitled, respectively, "List of Birds observed near Carson City, Nevada, from August 25 to September 16, and from November 10 to November 20, 1876, with Notes,"

and "List of Birds observed on the Eastern Slope of the Sierras, near Carson City, Nevada, from September 16 to November 7, with Notes." The genus *Passerella* is again overhauled....—W. B., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 137, 138, July, 1878.

LANGDON, FRANK W.—A Catalogue of the Birds of the vicinity of Cincinnati, with Notes. By Frank W. Langdon. Salem, Mass. The Naturalist's Agency, 1877, 8vo., pp. 18.

....embraces two hundred and seventy-nine species, about one third of which are marked as known to breed in the vicinity... The list is evidently prepared with care, and gives a convenient and undoubtedly trustworthy summary of the Avian Fauna of the locality of which it treats.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 34, January, 1878.

LAWRENCE, GEORGE N.—Descriptions of New Species of Birds from the Island of Dominica. By George N. Lawrence. *Ann. N. Y. Acad. Sci.*, Vol. I., pp. 46-49. Issued Dec., 1877.

The important explorations by Mr. F. A. Ober in some of the smaller West India Islands (Lesser Antilles) have been rich in interesting results relating to birds. The collections and observations made by Mr. Ober have been made the basis of several recent papers by Mr. George N. Lawrence, in which no less than fourteen species supposed to be new have been described....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 48, 49, January, 1879.

MCCAULEY, C. A. H.—Notes on the Ornithology of the Region about the Source of the Red River of Texas, from Observations made during the Exploration conducted by Lieutenant E. H. Ruffner, Corps of Engineers, U. S. A. By C. A. H. McCauley, Lieutenant Third United States Artillery. Annotated by Dr. Elliott Coues, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. III., No. 3, pp. 655-695, May 15, 1877.

....The paper includes notices of about one hundred species, with quite copious notes respecting the habits of a considerable proportion of them, with, in some cases, descriptions of their nests and eggs....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 76, 77, July, 1877.

MERRIAM, C. HART.—A review of the Birds of Connecticut, with Remarks on their Habits. By C. Hart Merriam. *Trans. Conn. Acad. of Arts and Sciences*, Vol. IV., pp. 1-150, July-Oct., 1877.

....Since the appearance of Linsley's "Catalogue of the Birds of Connecticut" in 1843, no detailed enumeration of the birds of that State has been published. Hence the advent of Mr. Merriam's paper must be hailed with interest by all engaged in the study of New England Ornithology. The author gives in all two hundred and ninety-two species.... In the careful elaboration of interesting details culled from personal experience and the note-books of well-known and trustworthy field collectors, this paper is most rich....—W. B., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 107, 108, October, 1877.

MINOT, H. D.—The Land-birds and Game-birds of New England, with descriptions of the birds, their nests and eggs, their habits and notes. With illustrations. By H. D. Minot.

"To him who in the love of Nature holds
"Communion with her visible forms, she speaks
"A various language;"

Bryant's Thanatopsis.

Salem, Mass. Naturalists' Agency. Boston: Estes & Lauriat. 1877. 8vo., pp. i-xvi and 1-456, frontispiece and woodcuts.

...the descriptions, however, are tersely original...the most prominent and most original features of the work are the artificial "keys."....—E. C., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 49, 50, April, 1877.

...the book has never been reviewed on its merits, and things which should have been severely censured have passed nearly unchallenged up to the present time...leaving out the faulty portions, which in nearly all cases relate to abstract points similar to those just cited [careless methods of work and identification], the pages bear the impress of accurate observation and original thought, while no one who loves the out-door side of Nature can fail to sympathize with the author's sentiment or to be impressed by the truth and beauty of many of his passages. It is a pity that one who writes so delightfully will mar his work by a persistent adhesion to false principles.—William Brewster, *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 242-244, October, 1881.

NELSON, E. W.—Birds of Northeastern Illinois. By E. W. Nelson. *Bull. Essex Inst.*, Vol. VIII., pp. 90-155, April, 1877.

It is not, however, from the simple enumeration of species that this list derives its chief value and interest, but from the unusually complete and satisfactory character of the biographical annotations, which embrace good descriptions of the habits of many birds previously but little known....—W. B., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 68, 69, July, 1877.

NELSON, E. W.—Notes upon Birds observed in Southern Illinois, between July 17 and September 4, 1875. By E. W. Nelson. *Bull. Essex Inst.*, Vol. IX., pp. 32-65, June, 1877.

...contains much information respecting the distribution, habits, and relative abundance of the summer birds of the southern portion of the...State....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 36, January, 1878.

RATHBUN, FRANK R.—A Partial Catalogue of the Birds of Central New York, from observations taken in the Counties of Cayuga, Seneca, and Wayne by Mr. H. G. Fowler, of Auburn, N. Y., and from the Cabinet of Skins of New York Birds collected by Mr. J. B. Gilbert, of Penn Yan, Yates County. Divided and arranged in accordance with the "Check List of North American Birds," by Elliott Coues, M.D., U. S. A., and dedicated to the Cayuga Historical Society. By Frank B. Rathbun. *Auburn Daily Advertiser* (newspaper) of August 14, 1877.

...The list contains one hundred and ninety-one species, with brief notes on their relative abundance, times of migration, etc. The

list bears evidence of trustworthiness....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 34, 35, January, 1878.

REICHENOW, ANTON.—Systematische Uebersicht der Schreitvögel (Gressores), einer natürlichen, die Iridæ, Ciconiidae, Phœnicopteridæ, Scopidae, Balænicipidae, und Ardeidae umfassenden Ordnung. Von Dr. Ant. Reichenow, Assistent am kgl. zoolog. Museum in Berlin. *Journal für Ornithologie*, XXV Jahrgang, pp. 113–171, 225–278, pll. i, ii. April and July, 1877.

....He also throws over all "barbarous" names, whether specific or generic, all names of erroneous signification, and all classical names improperly constructed. Under these restrictions many long-established and familiar designations fall, to be replaced by the next (in Dr. Reichenow's view) unobjectionable name. In default of any such our author proceeds to supply the deficiency.... While differing from Dr. Reichenow respecting important principles of nomenclature, and on various points of classification, we can but accord to his paper a high importance, as it evinces laborious and careful research, and embraces a vast amount of information, succinctly and lucidly presented, that will be of great service to future workers in the same field.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 183–185, October, 1878.

RIDGWAY, ROBERT.—Report of Geological Explorations of the Fortieth Parallel. Clarence King, Geologist in Charge. Vol. IV., Part III., Ornithology. By Robert Ridgway. 4to., pp. 303–670. 1877.

....a thorough and exhaustive account of the ornithology of an interesting belt of country. The observations were mainly limited to that portion of the Great Basin included between the thirty-ninth and forty-second parallels and extending from the Sierra Nevada to the Wahsatch Mountains... in point of nomenclature it represents the author's later views.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 82, 83 April, 1878.

ROOSEVELT, THEODORE, JR., and MINOT, H. D.—The Summer Birds of the Adirondacks in Franklin County, N. Y. By Theodore Roosevelt, Jr., and H. D. Minot. 8vo., pp. 4, 1877.

....a very acceptable list of the summer birds of the Adirondacks embracing ninety-seven species....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 36, January, 1878.

By far the best of these recent (local) lists which I have seen....—C. H. M., *Bull. Nutt. Ornith. Club*, Vol. III., p. 85, April, 1878.

ROWLEY, G. D.—Somateria labradoria (J. F. Gmelin). The Pied Duck. By G. D. Rowley, M.A., F.L.S., F.Z.S., etc., etc. Ornithological Miscellany, Vol. II., Part VI., pp. 205–223, with 5 plates, 1877. London: B. Quaritch, 15 Piccadilly, W.; Trübner & Co., Ludgate Hill, E. C.; R. H. Porter, 6 Tenterden St., Hanover Square, W.

....a timely and exhaustive contribution to the history of a species believed to be rapidly approaching extinction.... Mr. Rowley here gives

not only the literary history of the species, but discusses its relationship to the Eiders....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 79, 80, April, 1878.

SALVIN, OSBERT.—Salvin on the Procellariidæ. Rowley's Ornithological Miscellany. Part IV. London, 1887.

.... This paper is in two parts. The first is devoted to an examination of the unpublished "Banks' drawings," and the manuscripts of Dr. Solander, so far as they relate to the Petrels... Mr. Salvin's second paper is a careful examination of the new species of Petrels obtained by Dr. H. H. Giglioli during the voyage of the Italian corvette "Magenta" round the world....—T. M. B., *Bull. Nutt. Ornith. Club*, Vol. II., pp. 69, 70, July, 1877.

SHARPE, R. BOWDLER.—Catalogue of the Birds of the British Museum. Vol. III. Catalogue of the Coliormorphæ, containing the families Corvidæ, Paradiseidæ, Oriolidæ, Dieruridæ, and Prionopidæ. By R. Bowdler Sharpe. 8vo., pp. xiii., 344, pll. xiv. 1877.

In the third volume Mr. Sharpe enters upon the great series of Passerine Birds. The species here described by Mr. Sharpe number three hundred and sixty-seven.... We are sorry to see several instances of the use of the same name in a generic and specific sense for the same species....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 78, 79, April, 1878.

STREETS, THOMAS H.—Contributions to the Natural History of the Hawaiian and Fanning Islands and Lower California, made in connection with the United States North Pacific Surveying Expedition, 1873-75. By Thos. H. Streets, M.D., Passed Assistant Surgeon, U. S. Navy. *Bull. U. S. Nat. Mus.*, No. 7, 8vo., (Birds, pp. 9-33), Washington, 1877.

.... includes notes on about fifty species of birds, of which rather more than one-half were collected on the coast of Lower California and adjoining portions of the Mexican coast. The author acknowledges his indebtedness to Dr. Elliott Coues, U. S. A., for the identification of the birds, and adds that he has "kindly furnished the notes accompanying that portion of the ornithological collection from the Californian Peninsula".... there are many valuable biographical and other notes on several hitherto little known species.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 80, 81, April, 1878.

WILLARD, S. L.—A List of the Birds of Central New York. Utica, N. Y., 1877. By S. L. Willard, Esq. 16 pp.

The author's remarks in the way of a prelude are thus briefly expressed: "The following is a complete list of the birds of Central New York, with notes on their abundance." This might lead one to expect a valuable contribution to our science, but a perusal of the "List" proves this supposition to be erroneous....—C. H. M., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 83, 84, April, 1878.

1878.

ALLEN, J. A.—A List of the Birds of Massachusetts, with Annotations, by J. A. Allen. *Bull. Essex Inst.*, Vol. X., pp. 3-37, April, 1878.

It is seldom that one meets with a local catalogue more thoroughly satisfactory in all essential respects than the present one....this list presents the names of three hundred and sixteen species of ascertained occurrence in Massachusetts, not one of which can be challenged....one hundred and thirty-five are marked as breeding within the State...Thirty-five North American birds have been added to the Massachusetts list since 1867.—T. M. B., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 138-140, July, 1878.

AUGHEY, SAMUEL.—Notes on the Nature of the Food of the Birds of Nebraska. By Professor Samuel Aughey, of Lincoln, Neb. *First Ann. Rep. U. S. Ent. Comm. for the Year 1877*. Appendix II., pp. 13-62. 1878.

....The list numbers two hundred and fifty species, and hence includes a pretty large proportion of the birds that visit the State, and as the list relates ostensibly to only locust-eating species, our first feeling is one of surprise that it should be so large. Although Mr. Aughey's paper bears especially upon the subject of birds as grasshopper destroyers, it forms at the same time a valuable faunal list of the birds of Southern Nebraska, containing notes relating to the relative abundance and season of most of the species.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 110, 111, April, 1879.

AUGHEY, SAMUEL.—Some facts and considerations concerning the beneficial work of birds. By Professor Samuel Aughey, of Lincoln, Neb. *First Ann. Rep. U. S. Ent. Comm. for the Year 1877*, pp. 338-350, 1878.

....a special communication on the general subject of the usefulness of birds, with particular regard, however, to the locust question....he concludes that even the majority of Raptorial birds should be protected....He believes that sooner or later the protection of useful birds should become not only a national, but an international matter,....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 111, 112, April, 1879.

BREWER, T. M.—Notes on certain Species of New England Birds, with Additions to his Catalogue of the Birds of New England. By T. M. Brewer. *Proc. Boston Soc. Nat. Hist.*, Vol. XIX., pp. 301-309, April, 1878.

This paper adds twenty-one species to the "Catalogue of the Birds of New England," published by this author in 1875, and contains notes on twenty-seven other species of rare occurrence in New England. The whole number of "recognized forms" now admitted by him as having been taken in New England is three hundred and fifty-six...—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., p. 185, October, 1878.

BUREAU, LOUIS.—De la Mue du Bec et des Ornaments Palpébraux du

Macareux arctique, *Fratercula arctica* (Lin.) Steph., après la saison des amours. Par le Docteur Louis Bureau. *Extrait du Bulletin de la Société Zoologique de France*, 1877. 8vo. Paris, 1878. Pp. 1-21, pll. iv., v.

The remarkable changes which the bill and eyelids of the Common Puffin undergo after the breeding season have been hitherto unknown. The author's exposition of the matter reveals a phenomenon as yet unparalleled among birds. . . The author concludes this remarkable paper with some pertinent and suggestive observations on other species of *Fratercula* and on *Lunda cirrhata*. —Elliott Coues, *Bull. Nutt. Ornith. Club*, Vol. III., pp. 87-91, April 1878.

CORY, CHARLES B.—A Naturalist in the Magdalen Islands; giving a Description of the Islands, and List of the Birds taken there, with other Ornithological Notes. By Charles B. Cory. Illustrated from Sketches by the Author. Boston, 1878. Small 4to. Part II., Catalogue of Birds taken or observed in the Magdalen Islands, with Notes regarding those found breeding, etc., etc. Pp. 33-83.

In a sumptuous little quarto Mr. C. B. Cory has given an account of a summer trip to the Magdalen Islands in the Gulf of St. Lawrence. . . . Part I. consists of a general account of the Islands. . . and directions how to reach the Magdalen group, etc. Part II. gives a list of one hundred and nine species observed and taken by the author. . . The annotations relate mainly to the habits and relative abundance of the species. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., p. 171, July, 1879.

COUES, ELLIOTT.—Birds of the Colorado Valley. A Repository of Scientific and Popular Information concerning North American Ornithology. By Elliott Coues. Part First. Passeres to Laniidæ. Bibliographical Appendix. Seventy illustrations (woodcuts). 8vo. Pp. xvi., 807. Washington: Government Printing Office, 1878. "Miscellaneous Publications, No. 11," of the United States Geological Survey of the Territories, F. V. Hayden, U. S. Geologist-in-Charge.

In point of completeness, mode of execution, and general usefulness, the bibliography here under notice far excels any natural history bibliography known to us, and deserves to rank with the best bibliographies of any department of literature, and may well serve as a model for future workers in similar fields. . . . As regards the general work, or the "Birds of the Colorado Valley" as a whole, no more important contribution to the subject of North American Ornithology than this promises to be has for a long time appeared, and none covering all points of the field here taken; . . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 54-57, January, 1879.

COUES, ELLIOTT.—Field Notes on Birds observed in Dakota and Montana along the Forty-ninth Parallel during the Seasons of 1873 and 1874. By Dr. Elliott Coues, U. S. A., late Surgeon and Naturalist

U. S. Northern Boundary Commission. *Bull. U. S. Geol. Survey of the Territories*, Vol. IV., No. 3, pp. 545-661. July 29, 1878.

The observations relate mainly to the country . . . from Pembina on the Red River to the Rocky Mountains . . . a distance of about eight hundred and fifty miles. Dr. Coues in his preliminary remarks divides the country traversed into three regions, which he terms respectively the "Red River Region," the "Missouri Region," and the "Rocky Mountain Region." The physical and zoölogical characteristics of these regions are briefly detailed, to which is added a tabular enumeration of some of the more conspicuous birds of the three regions. Then follows a copiously annotated list of all the species observed . . . —J. A. A., *Bull. N. Y. Ornith. Club*, Vol. IV., pp. 49, 50, January, 1879.

JORDAN, DAVID STARR.—Manual of the Vertebrates of the United States, including the District east of the Mississippi River, and north of North Carolina and Tennessee, exclusive of Marine Species. By David Starr Jordan, Ph.D., M.D., etc. Second Edition, revised and enlarged. Chicago: McClurg & Co., 1878. 12mo., pp. 407.

. . . the second edition has not only been to some extent "revised," but enlarged by the addition of upwards of fifty pages of new matter. . . . The account of the fishes has been entirely re-written . . . —J. A. A., *Bull. N. Y. Ornith. Club*, Vol. III., pp. 145, 146, July, 1878.

LAWRENCE, GEORGE N.—Descriptions of Seven New Species of Birds from the Island of St. Vincent, West Indies. By George N. Lawrence. *Ann. N. Y. Acad. Sci.*, Vol. I., pp. 146-152. Issued May-September, 1878.

LAWRENCE, GEORGE N.—Descriptions of Supposed New Species of Birds from the Islands of Grenada and Dominica, West Indies. By George N. Lawrence. *Ann. N. Y. Acad. Sci.*, Vol. I., pp. 160-163. Issued May-September, 1878.

MAYNARD, C. J.—The Birds of Florida, with the Water and Game Birds of Eastern North America. By C. J. Maynard. Illustrated. 4to. Part IV., pp. 89-112, and one Plate. C. J. Maynard & Co., Newtonville, Mass., 1878.

. . . is wholly devoted to the family *Fringillidæ*, of which fourteen species are described . . . It is illustrated with a fine colored plate of the Ipswich or Pallid Sparrow (*Passerculus princeps*), representing the adult in spring. To original, somewhat detailed descriptions of the different phases of plumage of the various species treated the author adds short, very pleasantly written descriptions of their habits . . . —J. A. A., *Bull. N. Y. Ornith. Club*, Vol. III., p. 145, July, 1878.

RIDGWAY, ROBERT.—Studies of the American Herodiones. Part I.—Synopsis of the American genera of Ardeidæ and Ciconiidæ; including descriptions of three new genera, and a monograph of the

American species of the genus *Ardea*. By Robert Ridgway. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. IV., pp. 219-251, February 5, 1878.

The first of a series of papers here begun deals mainly with the *Ardeidee* and *Ciconiidee* . . . The *A. würdemanni* of Baird, which has been a puzzle to ornithologists for twenty years, is considered to be the "blue phase" of *A. occidentalis* . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 182, 183, October, 1878.

SAUNDERS, HOWARD.—On the Larinæ. By Howard Saunders. *Proc. Zööl. Soc. London*, 1878, pp. 115-212.

The whole number of species recognized in this paper is forty-nine, of which number twenty may be counted as North American . . . Mr. Saunders's paper evinces a remarkable success in disentangling the complicated web of European Gulls . . . and the service rendered by Mr. Saunders cannot fail to be appreciated by all who have experienced its need.—T. M. B., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 185-187, October, 1878.

SENNETT, GEORGE B.—Notes on the Ornithology of the Lower Rio Grande of Texas, from Observations made during the Season of 1877. By George B. Sennett. Edited, with Annotations, by Dr. Elliott Coues, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. IV., pp. 1-66, February 5, 1878.

. . . on one hundred and fifty-one species of birds observed on the southern border of Texas . . . Mr. Sennett certainly collected under many annoyances, but intensely hot days . . . did not prevent his securing some five hundred birds, one of which is new to science, namely, Sennett's Warbler (*Parula nigrilora*). The paper is most carefully commented by Dr. Coues . . . —H. A. P., *Bull. Nutt. Ornith. Club*, Vol. III., pp. 144, 145, July, 1878.

STEVENSON, H.—Adams's Notes on the Birds of Alaska. By H. Stevenson. *The Ibis*, 4th Series, Vol. II., pp. 420-442, Oct., 1878,

Some twenty-eight years ago (October, 1850) Mr. Edward Adams, a surgeon in the British navy . . . was sent to the Redoubt of Michalaski, on the shores of Norton Sound, Alaska. He remained there until late in the following June, and made some very interesting and valuable notes on the birds of the region. His collections were given to the British Museum, to Mr. John Gould, and to the late Mr. G. R. Gray. The latter dedicated to him the *Colymbus adamsi* . . . These early observations of Alaskan species . . . have intrinsic interest and are well worthy of attention.—T. M. B., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 52, 53, January, 1879.

WILSON, ALEXANDER, and BONAPARTE, CHARLES LUCIAN.—American Ornithology ; or, The Natural History of the Birds of the United States. Illustrated with plates engraved from drawings from Nature. By Alexander Wilson and Charles Lucian Bonaparte. Popular edition. Philadelphia : Porter and Coates. Three volumes in one.

It claims to be an exact reproduction, minus the atlas of colored plates, of the \$100, three-volume edition issued by the same firm some

years ago. No one can help rejoicing at any effort to disseminate more widely an acquaintance with Alexander Wilson and his charming and painstaking work. . . . But simply to reprint Wilson, even with Bonaparte added, at \$7.50, pointing out none of the errors, nor supplementing the shortcomings is, to say the least, utterly unnecessary to the advancement of the science.—E. I., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 53, 54, January, 1879.

1879.

BELDING, L.—A Partial List of the Birds of Central California. By L. Belding, of Stockton. Edited by R. Ridgway. *Proc. U. S. Nat. Mus.*, Vol. I., April, 1879, pp. 388-449.

. . . It is based, . . . upon observations extending through about twenty years' residence in California, and upon collections made chiefly during the last two years, which have from time to time, been forwarded by Mr. Belding to the National Museum . . . The number of species, exclusive of the wading and swimming birds, is 158 . . . In respect to the designation of incipient species, Mr. Ridgway uniformly adopts the system advocated by him in his paper on the use of trinomials in zoölogical nomenclature in the present number of the Bulletin . . . As already stated, Mr. Ridgway was the first to adopt the system of pure trinomials, and we regret to note his divergence therefrom . . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 167-171, July, 1879.

BREWER, T. M.—Some Additional Notes upon Birds observed in New England, with the Names of Five Species not included in his Previous Lists of New England Birds. By T. M. Brewer. *Proc. Boston Soc. Nat. Hist.*, Vol. XX., pp. 263-277. Published December, 1879.

. . . It forms a second supplement to his "Catalogue of the Birds of New England," published in 1875, and adds five species to the number previously recognized by him as New England birds, raising the whole number to 361 . . . These "Notes" form a convenient and connected record of recent discoveries in relation to many of the rarer New England birds, and add more or less that is new respecting some of them.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 108, 109, April, 1880.

COUES, ELLIOTT.—On the Present Status of *Passer domesticus* in America, with Special Reference to the Western States and Territories. By Dr. Elliott Coues, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. V., pp. 175-193, Sept. 6, 1879.

. . . a partial bibliography of, what is commonly termed the "Sparrow-War in America" in which are given the titles of most of the papers relating to this troublesome question, usually with a short digest of the papers mentioned. . . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 41, January, 1880.

COUES, ELLIOTT.—Second Instalment of American Ornithological Bibliography. By Dr. Elliott Coues, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. V., pp. 239-330, September 6, 1879.

. . . This part gives the titles of "Faunal Publications" relating to Central and South America, or that portion of America forming the

so-called "Neotropical Region."Beginning with Marcgrave in 1648, the list of titles is brought down to include most of those which appeared in the first half of the year 1879.Of the laborious research and care displayed in the preparation of this work, too great praise can scarcely be accorded.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 40, 41, January, 1880.

DARTT, MARY.—On the Plains and among the Peaks; or, How Mrs. Maxwell made her Natural History Collection. By Mary Dartt. Philadelphia: Claxton, Remsen, and Haffelfinger, 624, 626, 628 Market Street, 1879. 8vo., pp. 237.

Among the many wonderful "exhibits" at the recent Centennial Exposition in Philadelphia, few things attracted such general attention or created more surprise... than Mrs. M. A. Maxwell's collection of the animals of Colorado. This little book before us, devoted mainly to a very intelligent and pleasantly written account of how Mrs. Maxwell's work was accomplished, was prepared by a sister of that lady-naturalist. The main text of the work is intended for the general public, ...; but in an "Appendix" of twenty pages are given annotated lists of the mammals and birds represented in the collection, the former by Dr. Coues and the latter by Mr. Ridgway.... The list of birds numbers 234 species. The annotations relate mainly to an enumeration of the specimens represented, but occasionally to facts of distribution and locality of occurrence.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 113, 114, April, 1879.

ELLIOT, DANIEL GIRAUD.—A Classification and Synopsis of the Trochilidæ. By Daniel Giraud Elliot, F.R.S.E., etc. Washington City: Published by the Smithsonian Institution. March, 1879. 4to., pp. xii., 277, figg. 127 (wood-cuts in the the text).

...Mr. Elliot's concise and comprehensive "Synopsis" ... forms a most welcome aid to the student of this intricate group. Four hundred and twenty-six species are admitted as valid, distributed among one hundred and twenty genera. The leading characters of very nearly all the genera are represented by outline figures of the head, wing, and tail, and the species are described in sufficient detail for their easy recognition. ... The work closes with an appendix, giving an analytical key to the genera, and separate indexes to the generic and specific names... It will doubtless form a reference work for the group, not to be soon superseded, either in point of completeness or of usefulness.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 230-232, October, 1879.

GIBBS, MORRIS.—Annotated List of the Birds of Michigan. By Dr. Morris Gibbs. *Bull. of the U. S. Geol. and Geogr. Surv. of Terr.*, Vol. V., No. 3, pp. 481-497, November 30, 1879.

Although several prior lists of the birds of Michigan have appeared, the present one is a welcome addition to our knowledge of the ornithology of that State. Mr. Gibbs's list enumerates 310 species and sub-species, and contains brief notes on their relative abundance, breeding, times of migration, etc. ... Although mainly based on the observations of the author, he expresses his indebtedness to other sources of information....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 110, April, 1880.

HALLOCK, CHARLES.—The Sportman's Gazetteer and General Guide. Fifth edition. By Charles Hallock.

... This book has become a recognized authority on all subjects of which it treats, having been already republished in England, France, and Germany... The ornithological portions were, we believe, prepared by Mr. George B. Grinnell.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., p. 175, July, 1879.

HARVIE-BROWN, JOHN A.—Ornithological Journal of the Winter of 1878–79, with Collected Notes regarding its Effects upon Animal Life, including Remarks on the Migration of Birds in the Autumn of 1878, and the Spring of 1879. By Mr. John A. Harvie-Brown, F.Z.S., M.B.O.U. *Proc. Nat. Hist. Soc. Glasgow*, 1879, pp. 123–190.

... The winter of 1878–79 proved of unusual severity, and its effect upon animal life, and especially upon bird life attracted the attention of many careful observers, Mr. Harvie-Brown giving a list of more than a dozen published papers relating to the subject. These with his own observations and the collected notes of his many correspondents, form the basis of the paper above cited, ... nearly fifty pages being devoted to birds ...—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 233, 234, October, 1880.

HARVIE-BROWN, JOHN A.—The Capercaillie in Scotland. By J. A. Harvie-Brown, F.Z.S., Member of the British Ornithologists' Union, etc. Edinburgh: David Douglas, 1879, 8vo., pp. i–xv, 1–155, map and pll.

... Mr. Harvie-Brown treats the general subject of the Capercaillie in Scotland exhaustively. Beginning with such prehistoric evidence as is afforded by the bone-caves and Kitchen-middens... He then presents its history prior to extinction, followed by that of its restoration, and a detailed account of its increase and extension, illustrated by a map. He later discusses the influences which govern its increase, its relation to the decrease of Black Game, its damage to forests and grain, etc. Of special interest also are his chapters on the derivation, significance, and proper orthography of the word Capercaillie. In short, every point of the subject is elaborated with the utmost thoroughness, the work forming a model of its class.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 110, 111, April, 1880.

INGERSOLL, ERNEST.—Nests and Eggs of American Birds. By Ernest Ingersoll. S. E. Cassino, Naturalists' Agency, Salem, Mass. (No date.) Large 8vo. Part I., pp. 1–24, pll. i, ii., March, 1879.

... treats of ten species of Thrushes, and gives illustrations of their eggs. The text includes, not only descriptions of the nests and eggs of the species treated, but a full and pleasantly written account of their habits and breeding range... We wish that we could speak in terms of equal commendation of the chromo-lithographic plates, which are sadly defective in point of faithfulness to nature and in artistic execution.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., p. 172, July, 1879.

—Part II., pp. 25–48, pll. iii, iv., published August, 1879.

... we regret to perceive that the parts continue to appear without dating, or any indications whatever of the time of their publication;

and that textual references to the figures of the plates are still insufficiently explicit . . . Mr. Ingersoll has his subject well in hand now; he confines himself strictly to the announced scope of the treatise, and holds his subject fairly abreast of the information we have acquired respecting it.—E. C., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 38, 39, January, 1880.

——Part III., pp. 49–72, pll. v., vi., published October, 1879.

KRIDER, JOHN.—Forty Years' Notes of a Field Ornithologist, by John Krider, Member of the Philadelphia Academy of Natural Sciences and author of Krider's Sporting Anecdotes, Philadelphia. Giving a description of all birds killed and prepared by him. Philadelphia, 1879, 8vo., pp. i–xi., 1–84.

. . . Mr. Krider has "endeavored to describe and give the history of only those species of birds of the United States" which he has "collected and mounted," and whose nests have come under his personal observation . . . But a casual glance through the pages of his work is enough to show that these opportunities have been sadly neglected. . . In short, it is only too evident that Mr. Krider's "Notes" are the offspring of a fading memory rather than the carefully kept data of a systematic worker. . . Of the literary execution of the present work we can say nothing favorable. . . —W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 49, 50, January, 1882.

KUMLIEN, LUDWIG.—Contributions to the Natural History of Arctic America, made in Connection with the Howgate Polar Expedition, 1877–78. By Ludwig Kumlien, Naturalist of the Expedition. *Bull. U. S. Nat. Mus.*, No. 15, 1879. Birds, pp. 69–105.

. . . Of the 84 species noted, seven or eight relate to localities not Arctic, being species that visited the ship while off Newfoundland and neighboring points. Of the remainder only about twenty are land birds. The notes respecting many of the species are quite extended, and embrace many points of interest. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 109, 110, April, 1880.

LAWRENCE, GEORGE N.—Catalogue of the Birds of Dominica, from Collections made for the Smithsonian Institution by Frederick A. Ober, together with his Notes and Observations. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 48–69.

LAWRENCE, GEORGE N.—Catalogue of the Birds of St. Vincent, from Collections made by Mr. Frederick A. Ober, under the Directions of the Smithsonian Institution, with his Notes thereon. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 185–198.

LAWRENCE, GEORGE N.—Catalogue of the Birds of Antigua and Barbuda, from Collections made for the Smithsonian Institution, by Mr. Fred. A. Ober, with his Observations. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 232–242.

LAWRENCE, GEORGE N.—Catalogue of the Birds of Grenada, from a Collection made by Mr. Fred. A. Ober for the Smithsonian Institution, including others seen by him, but not obtained. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 265–278.

LAWRENCE, GEORGE N.—Catalogue of the Birds collected in Martinique by Mr. Fred. A. Ober for the Smithsonian Institution. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 349–360.

LAWRENCE, GEORGE N.—Catalogue of a Collection of Birds obtained in Guadeloupe for the Smithsonian Institution, by Mr. Fred. A. Ober. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 449–462.

LAWRENCE, GEORGE N.—A General Catalogue of the Birds noted from the Islands of the Lesser Antilles visited by Mr. Fred. A. Ober; with a Table showing their Distribution, and those found in the United States. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 486–488.

.... he has concluded his series of reports upon Mr. Ober's collections, made at various points of the Antillean chain (see above). The birds reported from Antigua and Barbuda number respectively 42 and 39 species, of which one.... from Antigua, is described as new. The list of birds from the island of Grenada numbers 54 species. The birds reported from Martinique number 40 species. The Guadeloupe species number 45.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 228–230, October, 1879.

LANGDON, FRANK W.—A Revised List of Cincinnati Birds. By Frank W. Langdon. *Journ. Cincinnati Soc. Nat. Hist.*, Vol. I., No. 4, January, 1879, pp. 167–193.

.... The 256 identified species are of the following categories: Constant residents, 27; summer residents, 62; winter visitants, 10; regular migrants, 82; irregular migrants, 37; casual visitants, 31; species that have disappeared within forty years, 7. It is a very good piece of work, based in greatest part on original personal observations, very carefully elaborated, with attention not only to the material facts presented, but to those niceties of workmanship which are too often neglected.... We are glad to see, especially among our younger writers on ornithology, evidence of increased attention to details of execution.... an article may be made a contribution to letters as well as to science. It is even worth while to spell correctly.—E. C., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 112, 113, April, 1879.

MEARNS, EDGAR A.—A List of the Birds of the Hudson Highlands, with Annotations. By Edgar A. Mearns. *Bull. Essex Institute*, Vol. X., pp. 166–179 (Introduction and *Turdus migratorius* to *Parus atricapillus*, inclusive), October–December, 1878.

MEARNS, EDGAR A.—A List of the Birds of the Hudson Highlands, with Annotations. By Edgar A. Mearns. *Bull. Essex Institute*, Vol. XI., pp. 43–52 (*Sitta carolinensis* to *Dendroæca cærulescens*), January–March, 1879.

———*Bull. Essex Institute*, Vol. XI., pp. 154–168 (*Dendroæca cærulea* to *Myiodiodes mitrata*), July–September, 1879.

———*Bull. Essex Institute*, Vol. XI., pp. 189–204 (*M. canadensis* to *Loxia curvirostra*), October–December, 1879.

The first part . . . appeared early in 1879, and three later instalments carry the list through the genus *Loxia*. . . while the writer draws mainly from his own experience, he occasionally indulges in quotations from other authors, his notices of some of the species amounting to nearly complete biographies. . . Two important features of the paper are the dates of arrival and departure. . . The future instalments of Mr. Mearns's highly praiseworthy memoir may well be anticipated with interest.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 175, July, 1880.

MCCHESNEY, CHARLES E.—Notes on the Birds of Fort Sisseton, Dakota Territory. By Chas. E. McChesney, Acting Assistant Surgeon, U. S. A. *Bulletin U. S. Geol. and Geogr. Surv. Terr.*, Vol. V., pp. 71–104, February 28, 1879.

. . . form a valuable contribution to the ornithology of a little known portion of the Northwest, namely, the elevated plateau in Dakota, known as the "*Coteau des Prairies*." . . The "Notes" are based on an experience of three years in the neighborhood of Fort Sisseton, and record 157 species, respecting most of which there are copious and interesting annotations. . . Dr. McChesney's report was transmitted to Dr. Cones for publication, and appears to have had the benefit of his revision. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 42, 43, January, 1880.

MCCHESNEY, CHARLES E.—Report on the Mammals and Birds of the General Region of the Big Horn River and Mountains of Montana Territory. By Charles E. McChesney, U. S. A. Being Appendix SS 3 of the Report of the Chief of Engineers for 1879.

. . . proves an interesting addition to the faunal records of the West. . . The list of 100 species of birds is the result of less than a month's investigation—from August 15 onward. . . The notes, though brief, are usually sufficient to indicate the occurrence of each species, and, as in the greater number of cases they result directly from the author's own observations, they carry with them the value of perfect authenticity. . . contains the name of not a single exclusively Eastern species. . . —H. W. H., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 107, 108, April, 1880.

MERRILL, JAMES C.—Notes on the Ornithology of Southern Texas. Being a List of Birds observed in the Vicinity of Fort Brown, Texas, from February, 1876, to June, 1878. By James C. Merrill, Assistant Surgeon U. S. Army. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 118–173.

. . . Two hundred and fifty-two species and varieties are given in all, and the character of their presence is in most cases satisfactorily de-

fined....the nests, eggs, and breeding habits of Texan birds receive the larger share of attention, and much of the matter pertaining thereto is as valuable as it is new....Numerous notes by Mr. Ridgway and Dr. Brewer occur throughout the paper and greatly enhance its value....In a few details of arrangement the paper is open to adverse criticism.... Altogether, however, the paper is a most excellent one, and its contents supply a fund of information the lack of which has been long felt.-- W. B., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 50-52, January, 1879.

RATHBUN, FRANK R.—A Revised List of Birds of Central New York. Based on the Observations of Frank R. Rathbun, H. Gilbert Fowler, Frank S. Wright, Samuel F. Rathbun, in the Counties of Cayuga, Onondaga, Seneca, Wayne, and Yates. Collated and prepared for Publication by Frank R. Rathbun. Auburn, N. Y.: Daily Advertiser and Weekly Journal Book and Job Printing House, April 17, 1879.

....in the present "Revised List" are enumerated 236, showing an addition of 46 species....In conclusion, it is but just to say that "The Ornithological Four" have in their "Revised List of Birds of Central New York," not only done themselves great credit, but have made a contribution to our science which must long remain authority concerning the region of which it treats. I consider it the best list of the birds of any part of this State that has appeared for many years.—C. H. M., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 172-175, July, 1879.

RIDGWAY, ROBERT.—On a new Humming-bird (*Atthis ellioti*) from Guatemala. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 8-10.

RIDGWAY, ROBERT.—A Review of the American Species of the Genus *Scops*, Savigny. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 85-117. Author's separates issued August 6, 1878.

RIDGWAY, ROBERT.—Description of Several New Species and Geographical Races of Birds Contained in the Collection of the United States National Museum. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 247-252. Author's separates issued December 10, 1878.

RIDGWAY, ROBERT.—Descriptions of Two New Species of Birds from Costa Rica, and Notes on other Rare Species from that Country. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 252-255. Author's separates issued December 10, 1878.

RIDGWAY, ROBERT.—Descriptions of New Species and Races of American Birds, including a Synopsis of the Genus *Tyrannus*, Cuvier. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. I., 1879, pp. 466-486. Author's separates issued April 25, 1879.

These (five) papers all notably evince Mr. Ridgway's well-known acuteness of discrimination and critical care in description and diagnosis....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 41, 42, January, 1880.

ROOSEVELT, THEODORE.—Notes on some of the Birds of Oyster Bay, Long Island. By Theodore Roosevelt. 8vo., 1 p. March, 1879.

This is a brochure of a single leaf, containing notes on seventeen species, observed at the above-named locality, by Mr. Theodore Roosevelt . . .—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., p. 171, July, 1879.

SENNETT, GEORGE B.—Further Notes on the Ornithology of the Lower Rio Grande of Texas, from Observations made during the Spring of 1878. By George B. Sennett. Edited, with Annotations, by Dr. Elliott Coues, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. V., No. 3, pp. 371–440, November 30, 1879.

The report of Mr. Sennett's three months' work (in April, May, and June) in 1878, near Hidalgo, Texas, adds greatly to our knowledge of the life-histories of many species of which we previously knew but little. . . . In addition to the notes on the habits of the birds observed, which in the case of the less known species amounts in some instances to full biographies, the author presents us with extended tables of measurements, gives detailed descriptions of nest and eggs, and occasionally discusses points of relationship and nomenclature. . . . The "Notes" relate to 168 species, and altogether form one of the most valuable of the many recent contributions to local ornithology.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 111, April, 1880.

SHARPE, R. BOWDLER.—Catalogue of the Birds in the British Museum. Vol. IV. Catalogue of the Passeriformes, or Perching Birds, in the British Museum. Cichlomorphæ: Part I., containing the families Campophagidæ and Muscicapidæ. By R. Bowdler Sharpe. London, 1879. 8vo., pp. xvi., 494, pll. xiv.

Of the *Campophagidæ* 148 species are described, of the *Muscicapidæ* 391. In style of treatment and general character this volume is similar to the earlier ones . . .—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 99, April, 1883.

VOGT, M. C.—L'Archæopteryx macroura.—Un intermédiaire entre les oiseaux et les reptiles. Par M. C. Vogt. La Revue Scientifique, 2e Série, 9e Année, No. 11, 13 Sept. 1879, pp. 241–248, figg. 18–21.

This specimen was found by M. Haeberlein in the same slates as the first. . . . From what Professor Vogt has discovered by a cursory examination there can be no doubt that much of great interest will be learned when this fossil is properly worked out from the matrix.—J. A. Jeffries, *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 107–109, April, 1881.

1880.

BELL, ROBERT.—List of Birds from the Region between Norway House and Forts Churchill and York. [By Robert Bell.] *Geological Survey of Canada*. Report of Progress for 1878–79 (1880). IV., Appendix vi., pp. 676–706.

. . . . an annotated list of 55 species, of much interest from the localities of observation. . . .—J. A. A., *The Auk*, Vol. II., p. 209, April, 1885.

BRAYTON, ALEMBERT W.—A Catalogue of the Birds of Indiana, with Keys and Descriptions of the Groups of greatest Interest to the Horticulturist. By Alembert W. Brayton, B.S., M.D. *Transactions of the Indiana Horticultural Society* for 1879, pp. 89-166. Indianapolis, 1880.

... is intended as a "practical hand-book" of the Birds of Indiana, and seems well calculated to meet this requirement. It is avowedly a compilation....we note little in Dr. Brayton's paper that is new to ornithologists, but much that is given from good authorities. Short notes are added relative to the abundance, habits, and season of occurrence of the 306 species enumerated....The paper closes with an index to the names of the genera and higher groups, with their derivations, a "glossary" of the specific names, and an index of English names. ...—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 174, 175, July, 1880.

BREWER, T. M.—Notes on the Nests and Eggs of the Eight North American Species of Empidonacæ. By T. M. Brewer. *Proc. U. S. Nat. Mus.*, Vol. II., 1880, pp. 1-10. Author's separates issued April 29, 1879.

... Following the measurements and descriptions of the nests and eggs of these eight species are several pages devoted to a consideration of the nests and eggs of *E. flaviventris*....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. IV., p. 232, October, 1879.

COOPER, J. G.—On the Migrations and Nesting Habits of West-Coast Birds. By J. G. Cooper, M.D. *Proc. U. S. Nat. Mus.*, Vol. II., 1880, pp. 241-251. Author's separates issued Jan. 20, 1880.

....Dr. Cooper has tabulated a large amount of valuable information respecting the times of arrival, departure, and nesting of many of the common West-Coast land birds, based mainly on his own observations....The number of species tabulated is 73....Dr. Cooper has here begun a good work in a praiseworthy way,....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 232, October, 1880.

CORY, CHARLES B.—Birds of the Bahama Islands; containing many Birds new to the Islands, and a Number of undescribed Winter Plumages of North American Birds. By Charles B. Cory, Author of "A Naturalist in the Magdalen Islands," etc. Illustrated. Boston: Published by the Author, 8 Arlington Street, Boston. 1880. 4to., pp. 350, with 8 colored plates.

....forms a valuable addition to our knowledge of the birds of these islands. Of the 149 species recorded, all but about 30 were met with by Mr. Cory,....In addition to the short descriptions of the species, the relative abundance and distribution of the species is noted, to which is frequently added a short account of their habits....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 107, April, 1880.

COUES, ELLIOTT.—Third Instalment of American Ornithological Bibliography. By Dr. Elliott Coues, U. S. A. *Bull. U. S. Geol.*

and *Geogr. Surv. of Terr.*, Vol. V., No. 4, 1879, pp. 521-1,066. Published Sept. 30, 1880.

...is by far the largest of the three, ...and completes his "Bibliography of Ornithology so far as America is concerned"... The present third instalment consists of a selection of titles belonging to the "systematic" department. ... In reference to the character of the work, it is enough to say that it is fully up to the high standard of excellence of the previous instalments. ... Its utility no working ornithologist can fail to highly appreciate, while it will form an enduring monument to the author's patience, industry, and thoroughness of research.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 44-46, January, 1881.

COUES, ELLIOTT.—Fourth Instalment of Ornithological Bibliography: being a list of Faunal Publications relating to British Birds. By Dr. Elliott Coues, U. S. A. *Proc. U. S. Nat. Mus.*, Vol. II., 1880, pp. 359-476. Published May 31, 1880.

This "Fourth Instalment" is of the same character as the first two, and attempts to do for British Birds what those did for American Birds ... As it is, being accurate as far as it goes, it will prove of great usefulness, and is entitled to the cordial welcome it will doubtless receive.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 46, January, 1881.

FORBES, S. A.—Studies of the Food of Birds, Insects, and Fishes, made at the Illinois State Laboratory of Natural History, at Normal, Illinois. By S. A. Forbes. *Illinois State Laboratory of Natural History Bulletin*, No. 3, November, 1880, 8vo., pp. 1-160.

... a further report of his studies, about seventy pages of which relate to birds.... The species of birds investigated are, as before, the Thrushes and the Bluebird....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 110, April, 1881.

FREKE, PERCY EVANS.—A Comparative Catalogue of Birds found in Europe and North America. By Percy Evans Freke. Dublin, 1880. 8vo., pp. 44. *From the Scientific Proceedings of the Royal Dublin Society.*

...forms an important contribution to geographical ornithology, About 225 North American species are enumerated.... Of about 100 species that may be considered as merely stragglers from one continent to the other, fully four-fifths are North American.... Despite a few typographical errors.... the paper gives evidence of careful preparation and admirably fills a long-standing gap in ornithological literature.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 173, 174, July, 1880.

GENTRY, THOMAS G.—Illustrations of Nests and Eggs of Birds of the United States, with Text, by Thos. G. Gentry. Philadelphia: J. A. Wagenseller, Publisher, No. 23 North Sixth Street. Copyright by J. A. Wagenseller, 1881. 4to., parts 1-25, pp. 1-300. 54 colored chromo-lithographs and chromo-portrait frontispiece of the author. 1880-82.

.... the plates were executed by Mr. Edwin Sheppard, "subject to the suggestions and dictations of the author." The title is misleading

for instead of treating of all the species found in the United States it deals with but fifty ... The typography and press work are good, but the plates fall far short of deserving the same praise.... of most of the plates.... the perspective is very bad.... and .. nearly all have the appearance of cheap chromo-lithographs.... the work does not contain anything approaching a complete "detailed account of the habits" of a single species ... instead of becoming an authority.... Mr. Gentry's book on nests and eggs must inevitably find its level alongside such unreliable and worthless productions as Jasper's "Birds of North America"....—C. H. M., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 246-248, October, 1882.

GREGG, W. H.—Revised Catalogue of the Birds of Chemung County, New York. By W. H. Gregg, M.D., Elmira, N. Y.: O. H. Wheeler. 1880.

.... we have a list of the birds of a locality to which little attention has been paid by ornithologists. The list of which this is a revision was issued ten years ago ... In all, 217 species are enumerated.... A few lines of notes accompany each name ...—E. I., *Bull. Nutt. Ornith. Club*, Vol. V., p. 173, July, 1880.

HARVIE-BROWN, J. A.—The Capercaillie in Scotland. By J. A. Harvie-Brown, F.R.S. *Scottish Naturalist*, July, 1880.

.... Mr. Harvie-Brown published last year an exhaustive little work on the Capercaillie in Scotland ... The present paper is a continuation of the Appendix of that work, giving an account of its extension in 1879, with a few additional references to early records of its presence in Scotland and Wales.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 46, January, 1881.

HARVIE-BROWN, JOHN A., and CORDEAUX, JOHN.—Report on the Migration of Birds in the Autumn of 1879. By John A. Harvie-Brown and John Cordeaux. *Zoölogist*, May, 1880, pp. 161-204.

... two well-known British ornithologists, have set themselves seriously at work in the matter of collecting exact data respecting the movements of birds during their migrations along the coasts of Great Britain.... Observations made at other points are incidentally incorporated, including Herr Gätke's report from Heligoland. The work so earnestly begun... should be a stimulus to concurrent action on the part of others, and nowhere are the conditions more favorable for systematic work than in the United States.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 175-177, July, 1880.

HARVIE-BROWN, JOHN A. — Second Report on Scottish Ornithology—October 1, 1879, to September 30, 1880. Compiled by Mr. John A. Harvie-Brown, F.R.S.E., etc. *Proc. Nat. Hist. Soc. of Glasgow*, Vol. IV., Part II., April, 1880, pp. 291-326.

.... The report gives a "Journal of the Winter of 1879-80" ... the report gives observations on some 65 to 70 species.... The report abounds with especially suggestive observations in relation to little understood points of bird-life....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 174, July, 1881.

HENSHAW, H. W.—Ornithological Report upon Collections made in Portions of California, Nevada, and Oregon. By H. W. Henshaw. *Annual Report of the U. S. Geogr. Surveys west of the Hundredth Meridian, for 1879.* Appendix L of the Report of the Chief of Engineers, February, 1880, pp. 282–335.

Mr. H. W. Henshaw's "Ornithological Report" for the field seasons of 1877 and 1878 is much more than a record of field observations for the seasons named, treating as it does most ably, though briefly, of the relationships of the members of several of the most puzzling groups of North American birds. In addition to having access to a large amount of material, much of which the author collected himself, he is able to bring to bear upon the questions at issue an intimate knowledge of the birds in life, and of the varying conditions of environment which surround the forms treated . . . In relation to the habits of the species mentioned, the Report contains much that is new, . . .—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 105–107, April, 1880.

LANGDON, FRANK W.—Ornithological Field Notes, with five Additions to the Cincinnati Avian Fauna. By Frank W. Langdon. *Journ. Cincinnati Soc. Nat. Hist.*, July, 1880, pp. 121–127, 1 pl.

These notes . . . virtually form a supplement to the same author's excellent "Revised List of Cincinnati Birds" published in 1879. . . . They relate to 40 species . . . Among the points of special interest are the capture of two specimens (male and female) of Kirtland's Warbler (*Dendroeca kirtlandi*) near Cleveland, May 4 and 12, 1880. . . . The paper is preceded by Dr. Langdon's description of a new species of *Helminthophaga*. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 232, 233, October, 1880.

MARSH, OTHNIEL CHARLES.—Odontornithes: a Monograph on the Extinct Toothed Birds of North America; with thirty-four Plates and forty Wood-cuts. By Othniel Charles Marsh, Professor of Palæontology in Yale College. 1 vol. 4to. Pp. i–x., 1–201, figg. 1–40, pll. i–xxxiv., each with 1 explanatory leaf. Forming Vol. VII. of the Reports of the Survey of the 40th Parallel.

. . . . It is the first of a series of monographs designed to make known to science the extinct vertebrate life of North America, in the investigation of which the author has passed the last ten years. It is unquestionably the most magnificent contribution ever made to our knowledge of extinct birds . . . It is safe to say that no single memoir on fossil birds hitherto published can be compared with this in accuracy of detail, in beauty of illustration, and in value of results attained . . . The present volume is based on the remains of more than one hundred different individuals of the *Odontornithes* procured in the Cretaceous deposits of the West during the last ten years . . . The work of Professor Marsh, as a whole, is an unmeasured advance upon all previously obtained knowledge of Cretaceous birds. The present volume is divided into two parts, the first treating of *Hesperornis*, the second of *Ichthyornis* and *Apatornis*, the entire skeleton of typical species being described with elaborate detail, and figured in the most perfect manner. . . . The Appendix presents a synopsis of the nine genera and twenty species of American Cretaceous Birds. . . —E. C., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 234–236, October, 1880.

MAYNARD, C. J.—The Birds of Florida, with the Water and Game Birds of Eastern North America. By C. J. Maynard. Illustrated. Published by C. J. Maynard & Co., Newtonville, Mass.

....the eighth part has just been received. The text is by far the most satisfactory part of the work, and contains much of interest, though, perhaps, too much space is given to the habits of some species as observed in New England and elsewhere. . . . Certain changes are made in nomenclature and classification, notably raising the Kingfishers and Nighthawks to the rank of orders. . . . Plates i., ii., iii., and xii. are passable, . . . but the others are extremely poor, Plate vii., in Part vi., has figures of sixty-six eggs of sixty-four species. . . .—J. C. M., *Bull. Nutt. Ornith. Club*, Vol. IV., pp. 114, 115, April, 1879.

MAYNARD, C. J.—The Birds of Eastern North America, with original Descriptions of all the Species which occur east of the Mississippi River between the Arctic Circle and the Gulf of Mexico, with full Notes upon their Habits. By C. J. Maynard. Containing thirty Plates drawn on Stone by the Author, C. J. Maynard & Co., Newtonville, Mass. 4to. (Thirteen Parts issued.)

See above, same work under another title.

... the peninsula (of Florida) has never received so much attention at the hands of any one ornithologist, not excepting Audubon, as from Mr. Maynard. It is a matter for regret that the later plans of the work had not been its original one. Had such been the case, the author would have been spared the necessity—if indeed it be a necessity—of repeating verbatim in the "Birds of Eastern North America" many pages of descriptive matter and biography which appeared in the "Birds of Florida".... In his classification Mr. Maynard has departed in many particulars from beaten paths, the basis for most of his changes being anatomical. . . . It is evident that the "Birds of Eastern North America" was written more with a view of striking the popular taste than as a hand-book for the systematic ornithologist, . . . In conclusion, we may be permitted to express the feeling that the portions of the work now before us do not by any means represent the author's best efforts, and that in certain particulars, but especially as regards the plates, he is capable of placing the work on a far higher plane than can at present be accorded it.—H. W. H., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 170–173, July, 1880.

MEARNS, EDGAR A.—A List of the Birds of the Hudson Highlands, with annotations. By Edgar A. Mearns. *Bull. Essex. Institute*, Vol. XII., pp. 11–25 (*Ægiothus linaria* to *Quiscalus purpureus*), January–June, 1880.

—*Bull. Essex. Institute*, Vol. XII., pp. 109–128 (*Corvus frugivorus* to *Ortyx virginiana*), July–September, 1880.

The high praise accorded the earlier instalments is equally merited by those now under notice, Mr. Mearns's "List of the Birds of the Hudson Highlands" ranking easily among the best of our long list

of contributions to local ornithology. . . . In respect to nomenclature, the list is abreast with the latest well-grounded innovations.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 172, July, 1881.

MINOT, H. D.—*The Diary of a Bird*. By H. D. Minot. Boston: A. Williams & Co., 1880, 8vo., pp. 38, cuts.

This entertaining and pleasantly written piece of bird-gossip is represented to be a translation of a "Diary" of a "Black-throated Green Warbler," and recounts, among other things the doings of "a grand mass meeting" of the birds to discuss "The Destruction and Extermination of Birds; how caused and how to be prevented," in which various members of the great bird convention relate their grievances. . . . The object of this attractive little brochure is to awaken popular interest in the general subject of the better protection of our birds, not only against the professional market gunner, but from their wholesale destruction to meet the demands of the milliner.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 112, April, 1880.

NEHRLING, H.—*Ornithologische Beobachtungen aus Texas*. I. Von H. Nehrling. *Monatsschrift des Deutschen Vereins zum Schutze der Vogelwelt*, V Jahrgang, No. 7, Juli, 1880, pp. 122–139.

These observations consist of a running commentary on the more common birds met with by Dr. Nehrling in March, April, and May, 1879, in Lee and Fayette Counties, Texas. It is apparently the first of a series of papers on the birds of Texas. . . . with, incidentally, notes on the mammals, the plants, and the general character of the country. . . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 109, April, 1881.

OBER, FREDERICK A.—*Camps in the Caribbees: The Adventures of a Naturalist in the Lesser Antilles*. By Frederick A. Ober. Boston: Lee and Shepard. New York: Charles T. Dillingham. 1880. 8vo., pp. xviii, 366, with 34 illus.

. . . . The general text introduces a good deal of ornithological matter, which will be found of interest and value, and the appendix is entirely devoted to this subject. It gives Mr. Lawrence's summary list of the species, 128 in number. . . . and also reproduces the original descriptions of all the new species discovered by the energetic and successful explorer.—E. C., *Bull. Nutt. Ornith. Club*, Vol. V., p. 179, July, 1880.

REICHENOW, ANTON, and SCHALOW, HERMANN.—*Compendium der neu beschriebenen Gattungen und Arten*. Von Anton Reichenow und Hermann Schalow. *Journal für Ornithologie*, 1879, pp. 308–329, 420–437; 1880, pp. 97–102, 194–209, 314–324.

The authors of the "Compendium" are placing ornithologists under a debt of gratitude in promptly bringing together the diagnoses of the new genera and species of current ornithological literature. The last instalment apparently covers the first half of the year 1880, and the families from *Cuculidæ* upward through the *Oscines*. . . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 111, April, 1881.

REICHENOW, ANTON, and SCHALOW, HERMANN.—*Zoologischer Jahresbericht für 1879*. Herausgegeben von der Zoologischen Station

zu Neapel. Redigirt von Prof. J. Victor Carus (W. Englemann, Leipzig). 5. Aves. Bd. II., pp. 1108-1161. Referenten Dr. Ant. Reichenow und H. Schalow.

....The report appears to be very carefully and satisfactorily prepared, the annotations being sufficiently full and explicit.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI, p. 111, April, 1881.

ROBERTS, THOMAS S.—The Convolutions of the Trachea in the Sandhill and Whooping Cranes. By Thomas S. Roberts, M.D. *American Naturalist*, Vol. XIV., February, 1880, pp. 108-114, figg.

... Mr. Roberts has given an admirable presentation of the tracheal characters of our two larger species of Cranes, illustrated with cuts ...—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 179, 180, July, 1880.

STEARNS, WINFRID A.—List of Birds of Fishkill on Hudson, N. Y. By Winfrid A. Stearns. 8vo., pp. 16, without date or publisher's impress. Published July 10, 1880.

This is a briefly annotated list of about 130 species, based on ten months' observations by the author in the vicinity of Fishkill... the list, though very incomplete, is doubtless trustworthy...—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 233, October, 1880.

STEERE, J. B.—A List of the Mammals and Birds of Ann Arbor and Vicinity. By Professor J. B. Steere. 8vo., pp. 8, 1880.

This briefly annotated list of 111 species (of birds) is good as far as it goes "...with the exception of a few, given upon the authority of labeled specimens in the Museum, it is the result of about three years' collecting and observation in this vicinity."—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 46, January, 1881.

1881.

BAILEY, H. B.—"Forest and Stream" Bird Notes. An index and summary of all the ornithological matter contained in "Forest and Stream," Vols. I-XII. Compiled by H. B. Bailey. New York: F. & S. Pub. Co., 39 Park Row, 1881. 8vo., paper, pp. iv., 195.

His work is more than a mere alphabetical list of names, followed by reference figures; for it includes ... a summary of each article indexed ... The Index also includes author's names, and among these the authorship of many pseudonyms and initial-signatures are for the first time properly exposed. The summation of the bird-matters seems to be quite complete and is certainly extensive...—E. C., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 175, 176, July, 1882.

FREKE, PERCY EVANS.—On Birds observed in Amelia County, Virginia. By Percy E. Freke. *Scientific Proc. Royal Dublin Society*, Vol. III. Part III. [Read February 21, 1881.]

... Mr. Freke has done good service in publishing the results of six years' observations in Amelia County, at a point about thirty

miles south of Richmond. His list, which is freely annotated, includes 112 species . . . The author has evidently fallen into some confusion regarding the spotted-breasted Thrushes of the genus *Turdus* . . . will be read with interest, not only as an exponent of the ornithology of a previously unworked section, but also as embodying a foreigner's pleasantly told impressions of many of our familiar birds.—W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., p. 48, January, 1882.

FREKE, PERCY EVANS.—North American Birds crossing the Atlantic. By Percy Evans Freke. 8vo., pp. 11. *Scientific Proc. Royal Dublin Society*, Vol. III., 1881.

This paper is based on the author's "Comparative Catalogue of Birds found in Europe and North America" . . . of which it may be regarded as in part a summary, as also a most valuable résumé of the general subject of North American birds occurring in Europe. The number of species is 69; the total number of occurrences, 494. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 114, 115, April, 1883.

FREKE, PERCY EVANS.—On European Birds observed in North America. By Percy E. Freke. *Zoölogist*, September, 1881.

The total number of species included in this list is 56, of which 9 are regarded as artificially introduced. . . The list seems to have been most carefully worked out, and may deservedly stand as a companion piece to Mr. J. J. Dalgleish's "List of Occurrences of North American Birds in Europe," published in Volume V. of this Bulletin. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 115, April, 1883.

GARROD, ALFRED HENRY, and FORBES, W. A.—In Memoriam. The Collected Scientific Papers of the late Alfred Henry Garrod, M.D., F.R.S., etc. Edited, with a biographical memoir of the author, by W. A. Forbes, B.A., etc. London: R. H. Porter, 6 Tenterden Street. 1881. 1 vol., 8vo., pp. xxvi., 538, pll. 33, frontispiece (portrait) and many cuts in text.

. . . Of the anatomical papers in the present volume, some 73 in number, more than half relate to birds, describing conditions of the osseous, muscular, respiratory, vascular, digestive, and nervous systems . . . and discussing in candid and scientific spirit . . . the bearing of the anatomical points upon classification. Of the accuracy and high rate of reliability of these papers there can be no question among them is an entirely new classification of birds, based primarily upon the ambiens [muscle]. . . —E. C., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 43, 44, January, 1882.

GODMAN, F. DUCANE, and SALVIN, OSBERT.—*Biologia Centrali-Americana*; or, Contributions to the knowledge of the Fauna and Flora of Mexico and Central America. Edited by F. Ducane Godman and Osbert Salvin. Zoölogy, Parts I-X. Aves, by O. Salvin and F. D. Godman, pp. 1-152, pll. i-x. 4to. London: Published for the Editors by R. H. Porter, 10 Chandos Street,

Cavendish Square, W., and Dulau & Co., Soho Square. September, 1879–April, 1881.

....As the title indicates, the work treats of the fauna and flora of Mexico and Central America....The ornithological portion is by the editors . . Of each species a short Latin description is given, and all the more important references to the literature are duly cited. . .The ten plates thus far published contain figures of 25 hitherto unfigured species . . .The importance and usefulness of the present work cannot . . .be easily overestimated....The execution of the "Biologia" as regards typography and illustrations....is excellent....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 174–176, July, 1881.

HARVIE-BROWN, JOHN A., CORDEAUX, JOHN, and KERMODE, PHILIP.—Report on the Migration of Birds in the Spring and Autumn of 1880. By John A. Harvie-Brown, F.L.S., F.Z.S., John Cordeaux, and Philip Kermode. London: W. S. Sonnenschein & Allen, 15, Paternoster Square. 1881. 8vo., pp. 120.

....we now....call attention to several late reports and papers on the same subject [migration of birds]. The report for 1880 forms a pamphlet of 120 octavo pages . . .printed schedules and letters of instruction were sent to 39 stations . . .on the east coast of Scotland . . .to 44 on the east coast of England; to 38 on the west coast of Scotland . . .and to 39 on the west coast of England, or to 160 stations in all. from 106 of which reports were received....The report for 1881 is of similar scope and character....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 228, 229, October, 1883.

HARVIE-BROWN, JOHN A.—Paper on the Migration of Birds upon our British Coasts, read before the Stirling Field Club, on Tuesday, 13th December, 1881, by J. A. Harvie-Brown, F.R.S.E., F.Z.S., etc. Stirling: Printed at the Journal and Advertiser Office. 1881. 12mo., pp. 12.

HATCH, P. L.—A List of the Birds of Minnesota. By Dr. P. L. Hatch. *Ninth Ann. Rep. Geol. and Nat. Hist. Surv. Minn.*, for 1880. 1881, pp. 361–372.

...a list of 281 species, briefly annotated....—E. C., *Bull. Nutt. Ornith. Club*, Vol. VII., p. 47, January, 1882.

HOLTERHOFF, G., JR.—A Collector's Notes on the Breeding of a few Western Birds. By E. [i. e., G.] Holterhoff, Jr. *American Naturalist*, March, 1881, pp. 208–219.

....The observations here recorded were made in Southern California in the spring of 1880 and have reference to some 40 species....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 173, July, 1881.

HOFFMAN, W. J.—Annotated List of the Birds of Nevada. By W. J. Hoffman, M.D., *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. VI., No. 2, Sept. 19, 1881, pp. 203–256, and Map.

....The list is based partly upon the writer's personal experience in the field during the season of 1871, but mainly upon . . . previously

published reports ... It hence partakes largely of the nature of a compilation, although the author's original notes are by no means few or uninteresting. ... The paper. ... closes with a bibliographical list of the chief publications relating to the region considered, and an excellent map of the State. ... Dr. Hoffman's paper ... should find a place in the hands of every working ornithologist. — W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., p. 51, January, 1882.

KRUKENBERG, C. FR. W.—Die Farbstoffe der Federn, in dessen vergleichend-physiologische Studien. Von Dr. C. Fr. W. Krukenberg. I Reihe, V Abth., 1881, pp. 72–92. Plate iii.

This paper, the first of a series, seems to be the product of more careful work than previous publications on the subject [coloring matter of feathers].... — J. Amory Jeffries, *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 114, 115, April, 1882.

LANGDON, F. W.—Field Notes on Louisiana Birds. By Dr. F. W. Langdon. *Journ. Cincinnati Soc. Nat. Hist.*, July, 1881, pp. 145–155.

.... “a record of ... the month ending April 17, 1881 at ‘Cinclair’ ... in the parish of West Baton Rouge” ... the paper will be welcomed as an acceptable contribution to our knowledge of a region which has been nearly a *terra incognita* to ornithologists since the days of Audubon. — W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 40, 49, January, 1882.

LANGDON, F. W.—Zoölogical Miscellany, edited by Dr. F. W. Langdon. *Jour. Cincinnati Soc. Nat. Hist.*, Vol. IV., Dec., 1881, pp. 336–346.

.... “facts ... respecting the structure, the life history, or the geographical distribution of the various species of animals constituting the Ohio Valley Fauna.” The part before us includes sections on mammalogy, ornithology, herpetology, ichthyology, conchology, and entomology ... the editor contributes a short but useful paper on the “Introduction of European Birds” ... — W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 50, 51, January, 1882.

LAWRENCE, GEORGE N.—Description of a New Subspecies of *Loxigilla* from the Island of St. Christopher, West Indies. By George N. Lawrence. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 204, 205.

.... Mr. Lawrence describes a new subspecies of *Loxigilla* (*L. portoricensis* var *grandis*).... — J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 114, April, 1883.

MACOUN, JOHN.—Extract from a Report of Exploration by Professor John Macoun, M.A., F.L.S. *Report of Department of Interior* (Ottawa, 1881 ?) 8vo., pp. 48.

.... chiefly (pp. 8–40) of Professor Macoun's own report of his explorations during the summer of 1880 ... north of our territories of Dakota and Montana ... the present paper possesses decided value, as

the observer appeared to have paid special attention to the distribution of birds in the wide area traversed. After a résumé of the leading ornithological features of the region is presented an annotated list of the species secured, 109 in number. . . . We feel at liberty to call attention to some manuscript alterations made by the author in our copy. For *Coturniculus passerinus* read *Zonotrichia albicollis*; for *Myiarchus crinitus*, read *Tyrannus verticalis*; for *Archibuteo lagopus*, read *A. ferrugineus* . . . for *Tringa canutus* read *T. bairdi*; for *Podilymbus podiceps*, read *Podiceps californicus*. . . —E. C., *Bull. Nutt. Ornith. Club*, Vol. VII, p. 113, April, 1882.

RATHBUN, FRANK R.—Bright Feathers or some North American Birds of Beauty. By Frank R. Rathbun: Illustrated with Drawings from Nature, and carefully colored by hand. Auburn, N. Y. Published by the Author, 1880. 4to. Part I., pp. i–viii, 9–24, colored Plate and colored Vignette.

. . . is an attractive piece of book-making; the drawing of the plate is passable, and the coloring is not more highly exaggerated than in many plates by authors of reputation for accuracy. The text more clearly betrays the hand of inexperience. . . . The author is evidently not wanting in knowledge of his subject; the faults of style he will doubtless be able to overcome as the work proceeds. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., p. 234, October, 1880.

—Part II.

Part II. of this work, . . . is devoted to the Rose-breasted Grosbeak (*Goniaphea ludoviciana*.) The colored plate illustrates the adult male and female, but the sixteen quarto pages (pp. 25–40) of text leave the history of the species still unfinished. In noticing Part I. . . . we were compelled to speak unfavorably of the literary execution of the work, and regret that the present issue will not permit of a more favorable notice. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 172, 173, July, 1881.

RIDGWAY, ROBERT.—Revisions of Nomenclature of certain North American Birds. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. III., 1881, pp. 1–16. Author's separates issued March 27, 1880.

. . . Mr. Ridgway takes as a starting-point Dr. Coues's "Check List" published in 1873, and formally notices many of the changes from the nomenclature there adopted. . . . and proposes many additional ones, the whole number here receiving attention amounting to upward of eighty. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. V., pp. 177, 198, July, 1880.

RIDGWAY, ROBERT.—Nomenclature of North American Birds chiefly contained in the United States National Museum. By Robert Ridgway. *Bull. U. S. Nat. Mus.*, No. 21. Published under the direction of the Smithsonian Institution. Washington: Government Printing Office, 1881. 8vo., pp. 1–94.

. . . its publication marks an epoch in North American ornithology. . . . The actual number of names . . . in the present catalogue (1881),

"924"....the system is trinomial....The work....evinces the exercise of the utmost care in its preparation.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 164-171, July, 1881.

RIDGWAY, ROBERT.—A Revised Catalogue of the Birds ascertained to occur in Illinois. By Robert Ridgway. *Illinois State Laboratory of Natural History. Bulletin No. 4.* Bloomington, Ill., May, 1881. 8vo., pp. 161-208.

....based primarily upon the same author's "Catalogue of the Birds ascertained to occur in Illinois," published....in 1874, but adds 31 species....341 now enumerated, besides 11 additional varieties.... The species known to breed (213 in number) are distinguished by an asterisk....The nomenclature is that of Mr. Ridgway's recently published "Catalogue of North American Birds".... Illinois takes the lead among the States in respect to number of species of birds....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI, pp. 171, 172, July, 1881.

ROBERTS, THOMAS S.—The Winter Birds of Minnesota. By Thomas S. Roberts. *Ninth Ann. Rep. Geol. and Nat. Hist. Surv. Minn., for 1880, 1881*, pp. 373-383.

....treats....of 52 species known to occur in the State in winter....the information given conveying a good idea of the bird-fauna at that season of the year....—E. C., *Bull. Nutt. Ornith. Club*, Vol. VII., p. 47, January, 1882.

SEEBOHM, HENRY.—Catalogue of the Birds in the British Museum. Vol. V. Catalogue of the Passeriformes, or Perching Birds in the British Museum. Cichlomorphæ: Part II., containing the family Turdidæ (Warblers and Thrushes). By Henry Seebohm. London, 1881. 8vo., pp. xvi, 426, pll. xviii.

....this group is defined in Mr. Sharpe's scheme of classification, with limits rather different from those usually assigned to it....we admire most heartily his [Mr. Seebohm's] thorough treatment of the subject in hand and the philosophic spirit in which he has approached his task....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 99-104, April, 1883.

SHARPE, R. BOWDLER.—Catalogue of the Birds in the British Museum. Vol. VI. Catalogue of the Passeriformes, or Perching Birds, in the collection of the British Museum. Cichlomorphæ: Part III., containing the first portion of the family Timeliidæ (Babbling Thrushes). By R. Bowdler Sharpe. London, 1881. 8vo., pp. xiii, 420, pll. xviii.

....In respect to the classification followed in these volumes, Mr. Sharpe states that it is based on that of the late Professor Sundevall.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 104, 105, April, 1883.

SHUFELDT, R. W.—Osteology of *Speotyto cunicularia* var. *hypogæa*. By R. W. Shufeldt, [First Lieutenant and] Assistant Surgeon,

U. S. Army. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. VI., No. 1, February 11, 1881, pp. 87-117, pl. i-iii.

SHUFELDT, R. W.—Osteology of *Eremophila alpestris*. By R. W. Shufeldt, [First Lieutenant and] Assistant Surgeon, U. S. Army. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. VI., No. 1, February 11, 1881, pp. 119-147, pl. iv.

As memoirs of descriptive osteology these papers merit high praise, and may well be welcomed as valuable contributions in a little worked field.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 109, 110, April, 1881.

SHUFELDT, R. W.—Osteology of the North American Tetraonidæ. By Dr. R. W. Shufeldt, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. VI., No. 2, pp. 309-350, pl. v-xiii.

...so far as we know, the most complete of any [paper] on American birds of one group ...—J. Amory Jeffries, *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 44, 45, January, 1882.

SHUFELDT, R. W.—Osteology of *Lanius ludovicianus excubitoroides*. By Dr. R. W. Shufeldt, U. S. A. *Bull. U. S. Geol. and Geogr. Surv. of Terr.*, Vol. VI., No. 2, pp. 351-359, pl. xiv.

The description ... is short, concise, and may be summed up in the statement that the skeleton of this bird is strictly Passerine.—J. Amory Jeffries, *Bull. Nutt. Ornith. Club*, Vol. VII., p. 45, January, 1882.

SHUFELDT, R. W.—The Claw on the Index Digit of the Cathartidæ. By R. W. Shufeldt, M.D. *American Naturalist*, November, 1881, pp. 906-908.

...this paper contains such important errors, both in regard to structure of birds and the literature of the subject that some rectification seems necessary. Dr. Shufeldt describes the claw at the end of the first finger of *Catharista atrata* as a new discovery, considering that claws outside of the Ostrich groups have not hitherto been described, and also states that it is a point of distinction between the Old and New World Vultures. ... the claw on the first finger is anything but an unknown object ... That the claw is absent in the Old World Vultures is also an error if we may trust the high authority of Nitzsch. ... as a rule the claws are much more conspicuous in young than in adult birds.—J. Amory Jeffries, *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 46, 47, January, 1882.

STEARNS, WINFRID A., and COUES, ELLIOTT.—New England Bird Life, being a Manual of New England Ornithology, revised and edited from the manuscript of Winfrid A. Stearns, Member of the Nuttall Ornithological Club, etc., by Dr. Elliott Coues, U. S. A., Member of the Academy, etc. Part I.—Oscines. Boston: Lee and Shepard, Publishers. New York: Charles T. Dillingham. 1881. 8vo., pp. 324, numerous woodcuts.

...we at length have a work on New England Birds of which no ornithologist need feel ashamed.... The main body of the work com-

prises two hundred and seventy pages and treats...the whole order *Oscines*. . . The claims of each species to be considered a member of the New England Fauna are critically examined. . . the design being to give a thoroughly reliable list of the Birds, with an account of the leading facts in the life-history of each species. The plan of the work includes brief descriptions of the birds themselves, enabling one to identify any specimen. . . To say that the book is exceedingly well-written would be doing it scant justice. Dr. Coues's brilliant talents in this respect are already well known, but we have perhaps never had so striking a proof of them as is afforded by the present volume. . . . Mr. Stearns may be congratulated on his wise choice of an editor.—W. B., *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 236-240, October, 1881.

1882.

BICKNELL, EUGENE PINTARD.—A Review of the Summer Birds of a part of The Catskill Mountains, with prefatory remarks on the faunal and floral features of the region. By Eugene Pintard Bicknell. *Transactions of the Linnean Society of New York*. Vol. I., pp. 113-168, December, 1882.

...is based on observations made "during brief explorations of the more southern Catskills in three successive years, from June 6-15, 1880; 12-18, 1881; 24-27, 1882. . . Twenty-five of the total fifty-six pages are devoted to prefatory remarks. . . Mr. Bicknell evidently has a penchant for the analysis and comparison of faunæ, and his remarks in the present connection are decidedly interesting. . . The list proper includes eighty-nine species and varieties. It is very fully annotated. . . .—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 53, January, 1883.

BLASIUS, RUDOLPH.—V. Jahresbericht (1880) des Ausschlusses für Beobachtungs-stationen der Vögel Deutschlands. *Journal für Ornithologie*, XXX Jahrg., Heft I, Jan., 1882, pp. 18-110.

The fifth annual report of the German observers for the year 1880 . . . is presented in the form of an annotated list of 280 species, compiled from the reports of the various observers. . . The notes relate to nesting of many of the species, as well as to their migrations. . . There are . . . reports from no less than 36 stations, and the résumé of the observations taken forms a paper of great interest and value.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 229, 230, October, 1883.

BROWN, NATHAN CLIFFORD.—A Catalogue of the Birds known to occur in the vicinity of Portland, Me. [etc.] By Nathan Clifford Brown. *Proc. Portland Soc. Nat. Hist.*, Dec. 4, 1882.

This excellent local list. . . is stated to be prepared from notes systematically taken during the past twelve years, and to contain the names of scarcely any species which have not passed under the author's personal observation. Its reliability is therefore evident. The number of species given is 250. . . The annotations, though not extensive, are to the point and seem judiciously adapted to convey a fair idea of the part each species plays in the composition of the Avifauna. . . —E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 112, 113, April, 1883.

CHAMBERLAIN, MONTAGUE.—A Catalogue of the Birds of New Brunswick, with brief notes relating to their migrations, breeding, relative abundance, etc. By Montague Chamberlain. *Bulletin of the Natural History Society of New Brunswick*. No. 1, pp. 23-68. Published by the Society. Saint John, N. B., 1882.

... This paper... comprises some forty-three pages, which are divided into two sections; "Section A" being restricted to species which occur in St. John and King's Counties; while "Section B" embraces "species which have not been observed in Saint John or King's Counties but which occur in other parts of the Province." The former division treats of a region to which the author has evidently paid special attention, and the text, being mainly based on his personal observations or investigations, includes many interesting and several important notes and records... Section B is almost wholly compiled... Mr. Chamberlain's work, so far as it has gone, has evidently been done carefully and well... in many respects it lacks the completeness that is desirable in a paper of its kind...—W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 176, 177, July, 1882.

COLLINS, J. W.—Notes on the Habits and Methods of Capture of various species of Sea Birds that occur on the Fishing Banks off the Eastern Coast of North America, and which are used as bait for catching Codfish by New England Fishermen. By Capt. J. W. Collins. *Ann. Rep. of the Comm. of Fish and Fisheries for 1882*, pp. 311-338, pl. i.

... particularly welcome, not only for the information they convey on these points [sea-birds captured and used as bait], but also respecting the relative abundance of the sea-birds met with on the fishing banks, their habits, seasons of occurrence, and migrations... The species captured in largest numbers is the Greater Shearwater (*Puffinus major*)...—J. A. A., *The Auk*, Vol. I., pp. 380, 381, October, 1884.

COUES, ELLIOTT.—The Coues Check List of North American Birds, revised to date and entirely rewritten under direction of the author, with a Dictionary of the Etymology, Orthography and Orthoëpy of the scientific names, the Concordance of previous lists, and a Catalogue of his Ornithological Publications. Boston: Estes and Lauriat. 1882. 1 vol. Royal 8vo., pp. 165.

... it is much more than a catalogue of North American birds... the erudition and scholarly research involved in this undertaking must be apparent to the most casual reader. The practical value of the work is equally plain... The total number of species and varieties enumerated is eight hundred and eighty-eight...—W. B., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 111, 112, April, 1882.

... The purpose of the present 'Check List' is, First to present a complete list of the birds now known to inhabit North America, north of Mexico and including Greenland... Secondly to take each word... explain its derivation, significance, and application, spell it correctly and indicate its pronunciation... Concerning the whole work we can say nothing stronger than that it is in every way worthy of its brilliant and distinguished author, who has evidently made it one of his most

mature and carefully studied efforts...it fills a field of usefulness peculiarly its own....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VII, pp. 242-246, October, 1882.

DUBOIS, ALPHONSE.—De la Variabilité des Oiseaux du genre *Loxia*.

Par M. Alph. Dubois, Conservateur au Musée royal d'histoire naturelle de Belgique. *Extrait du Bulletin du Musée royal d'histoire naturelle de Belgique*. Tome I. Oct., 1882.

....These varieties, races, or subspecies, he holds to be the result of the action of climate, food, or other "fortuitous causes" upon size and coloration, and states that his morphological studies have demonstrated that species are variable in proportion to the extent of their area of dispersion.....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 170, July, 1883.

DUTCHER, WILLIAM.—Is Not the Fish Crow (*Corvus ossifragus* Wilson) a winter as well as a summer resident at the northern limit of its range? By William Dutcher. *Transactions of the Linnean Society of New York*. Vol. I., pp. 107-111, December, 1882.

....is short, occupying less than three pages....The evidence cited is apparently conclusive....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 54, January, 1883.

FORBES, S. A.—The Regulative Action of Birds upon Insect Oscillations. By S. A. Forbes. *Bull. No. 6, Illinois State Laboratory of Nat. Hist.*, Dec., 1882, pp. 1-31.

Our best authority upon the insect food of birds has continued his observations upon the subject...The paper is very carefully worked up to show how effectively birds may restore a disturbed balance of life....We trust Professor Forbes will not desist from his good work. Such exact data as these are just what is required for the solution of the general problem which is offered by the relations of the bird-world to agriculture.—E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 105-107, April, 1883.

GENTRY, THOMAS G.—Nests and Eggs of the Birds of the United States [Pennsylvania]. 4to. 50 colored Plates. 1882.

Part I. of this new enterprise...has reached us.. The text of this number is meritorious, and the plates are not....—E. C., *Bull. Nutt. Ornith. Club*, Vol. V., p. 179, July, 1880.

HARVIE-BROWN, JOHN A., CORDEAUX, JOHN, and NEWTON, ALFRED.—

Report of the Committee, consisting of Mr. J. A. Harvie-Brown, Mr. John Cordeaux, and Professor Newton, appointed at Swansea "for the purpose of obtaining (with the consent of the Master and Brethren of the Trinity House, and of the Commissioners of Northern Lights) observations on the Migration of Birds at Lighthouses and Lightships, and of reporting on the same, at York, in 1831." London: Printed by Spottiswoode and Co., New-Street Square and Parliament Street. [1882.] 8vo., pp. 8.

HARVIE-BROWN, JOHN A., [etc.]—Report on the Migration of Birds in the Autumn of 1881. By John A. Harvie-Brown, Mr. John Cordeaux, Mr. Philip M. C. Kermode, Mr. R. M. Barrington, and Mr. A. G. More. London: Printed by West, Newman & Co., 54, Hatton Garden. 1882, 8vo., pp. 101.

HOFFMAN, W. J.—List of Birds observed at Ft. Berthold, D. T., during the month of September, 1881. By W. J. Hoffman, M.D. *Proc. Boston Soc. Nat. Hist.*, Feb. 1, 1882.

....the result of some observations made during September, 1881
Fifty-seven species were identified. The annotations are usually very brief. ... A novel feature of the list is that of the Indian names which are given for many of the common birds. —W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 54, 55, January, 1883.

INGERSOLL, ERNEST.—Birds'-Nesting: A Handbook of Instruction in Gathering and Preserving the Nests and Eggs of Birds for the Purposes of Study. By Ernest Ingersoll. Salem, 1882.

This little book is intended for a guide to the beginner... The book may be summarized as a readable account of the various modes of collecting birds' eggs and nests. A long account of the various paraphernalia for blowing and marking eggs is given. ... A list of unknown nests. contains faults of admission, though these are not numerous.—J. A. J., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 179, 180, July, 1882.

KNOWLTON, F. H.—A Revised List of the Birds of Brandon, Vt., and vicinity. By F. H. Knowlton. The Brandon Union (newspaper), February 10, 1882.

This is a briefly annotated list of 149 species. ... The chief interest of the list lies in its bearing upon the extent of the Alleghanian fauna in the Champlain valley. ... Mr. Knowlton has recorded Wilson's Plover ... instead of Wilson's Snipe.—C. F. B., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 113, 114, April, 1882.

KRUKENBERG, C. FR. W.—Die Farbstoffe der Federn in Dessen vergleichend-physiologische Studien. Von Dr. C. Fr. W. Krukenberg. II Reihe, I Abth., 1882, pp. 151, 171,

....the author describes the yellow pigment, Coriosulfurin, found in the tarsus of the birds of prey. ...—J. A. J., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 177, 178, July, 1882.

LAWRENCE, GEORGE N.—Description of a New Species of Swift of the genus *Chætura*, with Notes on two other little-known Birds. By George N. Lawrence. *Ann. New York Acad. Sci.*, Vol. II., No. 8, pp. 247, 248. March, 1882.

LAWRENCE, GEORGE N.—Descriptions of New Species of Birds from Yucatan, of the Families Columbidae and Formicariidae. By George N. Lawrence. *Ann. New York Acad. Sci.*, Vol. II., No. 9, pp. 287, 288. May, 1882.

LAWRENCE, GEORGE N.—Description of a New Species of Bird of the Family Cypselidae. By George N. Lawrence. *Ann. New York Acad. Sci.*, Vol. II., No. 11, pp. 355, 356. December, 1882.

LINDEN, CHARLES.—On the Domestication of some of our Wild Ducks. By Charles Linden. *Bull. Buffalo Soc. Nat. Sciences*, Vol. IV., No. 2, pp. 33–39, 1882.

After brief reference to the various species of wild Ducks that formerly frequented Lake Chautauqua, Western New York, which have now mostly become rare, Mr. Linden summarizes the results of systematic efforts continued for nearly thirty years by Mr. George Irwin at the above-named locality to domesticate several of the species. These were the Mallard, Dusky Duck, Wood Duck, Blue-winged Teal, and American Swan. All of these bred freely and reared their young in confinement....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 233, October, 1883.

MERRIAM, CLINTON HART.—The Vertebrates of the Adirondack Region, Northeastern New York. By Clinton Hart Merriam, M.D. [First Instalment.] *Transactions of the Linnean Society of New York*. Vol. I., pp. 5–106, December, 1882.

.... The present instalment of Dr. Merriam's paper does not extend to birds.... its introductory portion has a direct bearing on everything to follow.... As a contribution to our knowledge of the habits, food, times and manner of breeding, etc., of many of the northern mammals this paper is an important one....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 50–53, January, 1883.

MORDEN, J. A., and SAUNDERS, W. E.—List of the Birds of Western Ontario. By J. A. Morden and W. E. Saunders. *Canadian Sportsman and Naturalist*, Vol. II., Nos. 11 and 12, pp. 183–187, 192–194. November and December, 1882.

.... a briefly annotated list ... numbering 236 species ... a valuable addition to our knowledge of the distribution of Canadian birds....—J. A. A., *The Auk*, Vol. I., p. 85, January, 1884.

REICHENOW, ANTON.—Conspectus Psittacorum. Systematische Uebersichte aller bekannten Papageienarten. Von Dr. Ant. Reichenow. 8vo., Berlin, 1882, pp. 234. (Sonderabdruck aus Journal für Ornithologie, XXIX Jahrg., 1881, pp. 1–49, 113–177, 225–289, 337–398.)

The order *Psittaci* is divided into 9 families and 45 genera (including 27 subgenera); 444 species and subspecies are recognized.... English and French, as well as German, vernacular names are given.... It originally appeared in parts in the "Journal für Ornithologie" for 1881.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 169, July, 1883.

REICHENOW, ANTON.—Die Vögel der Zoologischen Gärten. Leitfaden zum Studium der Ornithologie mit besonderer Berücksichtigung der in Gefangenschaft gehaltenen Vögel. Ein Handbuch für

Vogelwirth. Von Dr. Ant. Reichenow. In zwei Theilen. [Theil I.] Leipzig, 1882, 8vo., pp. xxx., 278.

Dr. Reichenow's handbook for bird-keepers is designed to furnish . . . the means of readily identifying such species as are kept in zoölogical gardens, parks, and aviaries, and seems to be well adapted to that end. The first part . . . treats of 695 species . . . Concise diagnoses are given . . . and English and French, as well as German, vernacular names are supplied for the species. As a popular hand book for German readers . . . the work seems worthy of generous commendation.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 232, October, 1883.

REICHENOW, ANTON.—Die Entenvögel der Zoologischen Gärten. Von Ant. Reichenow. Ornithologisches Centralblatt, VII Jahrg., Nos. 1-6. Jan.-May, 1882, pp. 1-5, 17-23, 35-40.

. . . enumerates the species of *Lamellirostres* . . . giving brief diagnoses of the species kept in zoölogical gardens. . . —J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 232, October, 1883.

REICHENOW, ANTON, and SCHALOW, HERMAN.—Compendium der neu beschriebenen Gattungen und Arten. Von Anton Reichenow und Herman Schalow. Journal für Ornithologie, XXIX Jahrg., 1881, pp. 70-102, 417-423; XXX Jahrg., 1882, pp. 111-120, 213-228.

This convenient summary . . . is still continued . . . it gives transcripts of the original diagnoses, when such are given, and in other cases mentions the types of the genera and the alleged characteristics of the species.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 169, July, 1883.

RIDGWAY, ROBERT.—On a Duck new to the North American Fauna. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 22-24. Author's separates issued April 13, 1881.

. . . Mr. Ridgway records an immature male Rufous-crested Duck (*Fuligula rufina*, Steph.) supposed to have been shot on Long Island Sound. . . In making the record Mr. Ridgway takes occasion to describe the species in its various phases of plumage, and adds a few critical remarks on the generic synonymy of the group to which it belongs.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., p. 173, July, 1881.

RIDGWAY, ROBERT.—On *Amazilia yucatanensis* (Cabot) and *A. cervini-ventris*, Gould. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 25, 26. Author's separates issued April 13, 1881.

. . . Comparative diagnoses are given of the two species, with some remarks respecting their distribution.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VI., pp. 173, 174, July, 1881.

RIDGWAY, ROBERT.—A Review of the genus *Centurus*, Swainson. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 93-119. Author's separates issued June 2, 1881.

This revision is based on an examination of 227 specimens, representing 12 of the 14 forms considered as sufficiently distinct for recog-

...Each form recognized is described in detail, and the whole subject is treated with Mr. Ridgway's usual care and completeness.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 114, April, 1883.

RIDGWAY, ROBERT.—List of Species of Middle and South American Birds not contained in the United States National Museum. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 165–203. Author's separates issued Aug. 11 and Nov. 18, 1881.

...The species wholly unrepresented are very few....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 170, July, 1883.

RIDGWAY, ROBERT.—List of Special Desiderata among North American Birds. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 207–223. Author's separates issued Nov. 18, 1881.

RIDGWAY, ROBERT.—Catalogue of Old World Birds in the United States National Museum. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 317–333. Author's separates issued March 8, 1882.

...The numeration and classification adopted is that of Gray's well-known "Hand-list."—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 231, October, 1883.

RIDGWAY, ROBERT.—Notes on some Costa Rican Birds. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 333–337. Author's separates issued March 10, 1882.

RIDGWAY, ROBERT.—Description of a new Flycatcher and a supposed new Petrel from the Sandwich Islands. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 337, 338. Author's separates issued March 29, 1882.

RIDGWAY, ROBERT.—Description of a new Owl from Porto Rico. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 366–371. Author's separates issued April 6, 1882.

RIDGWAY, ROBERT.—Description of two new Thrushes from the United States. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 374–379. Author's separates issued April 6, 1882.

RIDGWAY, ROBERT.—On two Recent Additions to the North American Bird Fauna, by L. Belding. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 414, 415. Author's separates issued April 24, 1882.

In numerous papers published in the "Proceedings" of the National Museum for 1881 and 1882, Mr. Ridgway has described a considerable number of new species and races of birds and several new genera, chiefly from North and Middle America. They also contain notes on a few other hitherto little known species....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 168, 169, July, 1883.

SAUNDERS, HOWARD.—On some Laridæ from the coasts of Peru and Chili, collected by Capt. Albert H. Markham, R.N., with Remarks on the Geographical Distribution of the Group in the Pacific. By Howard Saunders, F.L.S., F.Z.S. *Proc. Zool. Soc. of London*, June 6, 1882, pp. 520–530; with colored plate of *Xema furcatum* adult and young.

... Fifteen species are represented: among these is a specimen (the third one known) of *Xema furcatum*,... now rediscovered after an interval of forty years' fruitless search. Mr. Saunders is one of the few scientific writers who possess the happy faculty of making a technical treatise interesting to the average reader. The present paper... has a direct value to the student of North American ornithology, for much of its subject-matter... relates to species which are included in the North American Fauna.—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 54, January, 1883.

SHUFELDT, R. W.—Contributions to the Anatomy of Birds. By R. W. Shufeldt, M.D. [etc.] Author's edition, extracted (in advance) from the Twelfth Annual Report of the late U. S. Geological and Geographical Survey of the Territories (Hayden's). Washington: Government Printing Office, October 14, 1882. 8vo., title and pp. 593–806; pll. i–xxiv., many woodcuts in text.

It includes chapters on the osteology of *Spectylo cunicularia hypogaea*, *Eremophila alpestris*, the North American *Tetraonidæ* and the *Cathartidæ*. These subjects have been already treated by Dr. Shufeldt in previous papers....; but its subject-matter has been largely, if not entirely rewritten, and some unfortunate errors... corrected.... The paper on the *Cathartidæ* with its accompanying plates, is entirely new matter.—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 56, January, 1883.

Under this title a meritorious and very promising ornithotomist has brought together the greater part of what he has thus far accomplished in the way of avian anatomy.... It would scarcely be fair, however, to judge their reappearance by their original character, all of them having been carefully revised and to some extent rewritten.... The text is a faithful and on the whole an accurate description of the objects under designation, and the fidelity with which the plates are executed is most commendable....—E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 166–168, July, 1883.

STEJNEGER, LEONHARD.—Description of two new Races of *Myadestes obscurus* Lafr. By Leonhard Stejneger. *Proc. U. S. Nat. Mus.*, Vol. IV., 1882, pp. 371–374. Author's separates issued April 6, 1882.

... *M. obscurus* var. *occidentalis*, from the highlands of Southern Mexico and Guatemala, and *M. obscurus* var. *insularis*, from the Tres Marias Islands.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 170, July, 1883.

WHEATON, J. M.—Report on the Birds of Ohio. By J. M. Wheaton, M.D. *Report of the Geological Survey of Ohio*, Vol. IV., pt. i.,

pp. 188-628. Columbus, Ohio: Nevins & Myers, State Printers. 8vo. 1882.

....a treatise on the ornithology of the State so extensive and so systematic that the time its preparation has occupied seems justified if not absolutely required ... Dr. Wheaton's report must at once take place at the head of State Faunas, so far as ornithology is concerned ... Ohioans have here, in fact, a correct history and description of their 300 birds, systematically arranged and classified, with diagnoses of the genera and higher groups, a considerable synonymy of each species with special reference to State literature, and a local bibliography.... this volume of some 450 pages is no slight nor uncertain addition to our ornithological literature....—E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 110-112, April, 1883.

WHITE, GEORGE R., and SCOTT, W. L.—Commentary on the Bird-Fauna of the Vicinity of Ottawa. By Geo. R. White and W. L. Scott. Report of Ornithological and Oölogical Branch, *Trans. Ottawa Field Naturalists' Club*, No. 3, pp. 26-34, and Appendix.

The list is briefly annotated, and contains 169 species ... we are astounded to see in the list *Harporhynchus cinereus*! *Parus rufescens*! *Vireo pusillus*! *Glucidium passerinum* var. *californicum*! This of course puts the whole affair under a cloud as an incompetent and doubtless pretty nearly worthless performance. —E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 55, January, 1883.

[....The authors....had no opportunity to correct the proof-sheetsEdd.] *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 115, 116, April, 1883.

1883.

BECKHAM, CHARLES WICKLIFFE.—A List of the Birds of Bardstown, Nelson County, Kentucky. By Charles Wickliffe Beckham. *Journ. Cincinnati Soc. Nat. Hist.*, Vol. VI., pp. 136-147, July, 1883.

....the first paper on the birds of Kentucky, as such, which has yet appeared, and relating mainly to the birds of the immediate vicinity of Bardstown, "...no species has been admitted on any but the best of evidence; out of the one hundred and sixty-seven enumerated, the writer is himself responsible for all but eight of them."....The list is briefly annotated ... is well printed, and evidently carefully prepared—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 227, 228, October, 1883.

COOKE, W. W.—Mississippi Valley Migration. By W. W. Cooke. *Ornithologist and Oölogist*, Vol. VIII., Nos. 4-7, April-July, 1883, pp. 25-27, 33, 34, 41, 42, 49-53.

....Mr. Cooke's scheme contemplates a large number of observing stations ... he appears to have correspondents at 44 stations ... his matter is pertinent and in most cases well arranged; while his summaries respecting the movements of particular species, as given in his later papers, show at a glance what are the results attained.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 230, 231, October, 1883.

COOKE, W. W.—Bird Migration in the Mississippi Valley. By W. W. Cooke. *Forest and Stream*, Vol. XIX., Nos. 15, 16, 20, pp. 283, 284, 306, 384, November 9 and 16, and December 14, 1883.

CORY, CHARLES B.—Beautiful and Curious Birds of the World. By Charles B. Cory. Published by the Author. Part IV. Elephant folio. Three Plates, with Text.

....contains plates of *Pseudogryphus californianus* ...; *Camptolæmus labradorius* ...; *Astrapia nigra*, the Incomparable Bird of Paradise....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 55, 56, January, 1883.

CORY, CHARLES B.—Beautiful and Curious Birds of the World. By Charles B. Cory. Published by the Author. Part V. Elephant folio. Three Plates, with Text.

....has illustrations of *Epimachus magnus*, the Magnificent Bird of Paradise, *Epimachus elliotti*, Elliott's Bird of Paradise and *Pluvianus ægyptius*, the Crocodile Bird of the Nile....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 55, 56, January, 1883.

CORY, CHARLES B.—Beautiful and Curious Birds of the World. By Charles B. Cory. Published by the Author. Parts VI. and VII. Elephant folio.

....completes the work, which consists of twenty plates, with accompanying text....The plates.. are superb illustrations of some of the most striking forms of bird-life....—W. B., *The Auk*, Vol. I., p. 81, January, 1884.

COUES, ELLIOTT.—A Hearing of Birds' Ears. By Elliott Coues. *Science*, Vol. II., Nos. 34, 38, and 39, pp. 422-424, 552-554, 586-589, Sept. 28, Oct. 26, Nov. 2, 1883, figg. 9.

....A clear and detailed account of the mechanism of the ear in birds, taking the human ear as the chief basis of comparison....—J. A. A., *The Auk*, Vol. I., p. 182, April, 1884.

COUES, ELLIOTT, and PRENTISS, D. WEBSTER.—Bulletin of the United States National Museum, No. 26. *Avifarna Columbiana*: being a list of Birds ascertained to inhabit the District of Columbia, with the times of arrival and departure of such as are non-residents, and brief notices of habits, etc. The Second Edition, revised to date and entirely rewritten. By Elliott Coues, M.D., Ph.D., Professor of Anatomy in the National Medical College, etc., and D. Webster Prentiss, A.M., M.D., Professor of Materia Medica and Therapeutics in the National Medical College, etc. Washington: Government Printing Office, 1883. 8vo., pp. 133, 100 woodcuts, frontispiece, and 4 folded maps.

The title of this interesting brochure, although explicit, fails to fully imply the scope of the work, 4 pages of which are devoted to the 'Literature of the Subject,' 17 to the 'Location and Topography of

District,' 5 to the 'General Character of the Avifauna,' 78 to the 'Annotated List of the Birds,' 8 to a 'Summary and Recapitulation,' and 3 to the 'Game Laws of the District'....The original 'List'.... published in 1862, contained 226 species....The additions made in the twenty-two years which have intervened number 23....The subject in general is treated not only with great fulness, but is very attractively set forth, and in general plan forms an excellent model of what a faunal list should be ...—J. A. A., *The Auk*, Vol. I., p. 386, October, 1884.

GADOW, HANS.—Catalogue of the Birds in the British Museum. Vol. VIII. Catalogue of the Passeriformes, or Perching Birds. Cichlomorphæ : containing the Families Paridæ and Laniidæ (Titmice and Shrikes), and Certhiomorphæ (Creepers and Nuthatches). By Hans Gadow, Ph.D. London : Printed by order of the Trustees. 1883. 8vo., pp. i-xiii., 1-386, pll. i-ix., and woodcuts in the text.

....Dr. Gadow's volume opens with the Paridæ (including the Regulidæ *auct.*), of which 10 genera and 82 species are recognized....The Laniidæ embrace five subfamilies....The family Certhiidæ includes the Nuthatches as well as the Tree-Creepers....In general, Dr. Gadow inclines to the recognition of comprehensive groups, from families downward. His reduction in genera and species from the hitherto current status is very marked....In method of execution, the present volume is strictly in accord with its predecessors, and is neither less valuable nor less welcome.—J. A. A., *The Auk*, Vol. I., pp. 279-281, July, 1884.

GILL, THEODORE.—Record of Scientific Progress for 1881. Zoölogy. By Theodore Gill. Smithsonian Report, 1881 (1883), pp. 408-498. Birds, pp. 481-490.

... a partial bibliography of noteworthy papers and works, and a synopsis of about half-a-dozen memoirs....—J. A. A., *The Auk*, Vol. I., p. 84, January, 1884.

Goss, N. S.—A Catalogue of the Birds of Kansas. By N. S. Goss. Published under the direction of the Executive Council. Topeka, Kansas : Kansas Publishing House, 1883. 8vo., pp. iv., 34.

.... a carefully annotated list of the birds of the State, prepared at the request and under the direction of the State Executive Council ... very few species are given on other authority than his own observations....the list includes 320 species and races, 161 of which are marked as known to breed. The annotations are brief but pertinent....the list...attains in general a high grade of excellence....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 227, October, 1883.

JEFFRIES, J. AMORY.—The Epidermal System of Birds. By J. Amory Jeffries. *Proc. Boston Soc. Nat. Hist.*, Vol. XXII., pp. 203-240, pll. iv-vi. Dec., 1883.

....reports the results of his studies of the epidermal appendages in birds, with reference to their structure, development, and homologies....—J. A. A., *The Auk*, Vol. I., pp. 182, 183, April, 1884.

KING, F. H.—Economic Relations of Wisconsin Birds. By F. H. King. *Wisconsin Geological Survey*, Vol. I., chap. xi., pp. 441–610, figg. 103–144. Royal 8vo.

....Prof King's field-work....was commenced in 1873, and is apparently only just concluded—his attention during this long period being steadily and rigidly directed to discovering what and how much food Wisconsin birds eat...The facts recorded...were obtained from an examination of the contents of over 1,800 birds....The Introduction closes with "a Temporary Classification of Wisconsin Birds on an economic basis"...The body of the report is primarily of the nature of an ordinary "local list" for the State of Wisconsin, giving in systematic order 295 species....The report is well written, giving in many cases extended biographies...The numerous woodcuts are chiefly taken from Baird, Brewer, and Ridgway.—E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 107–110, April, 1883.

LAWRENCE, GEORGE N.—Descriptions of New Species of Birds of the Genera *Chrysotis*, *Formicivora*, and *Spermophila*. By George N. Lawrence. *Ann. New York Acad. Sci.*, Vol. II., 1892, No. 12, pp. 381–383. Issued June, 1883.

The species here described are : 1. *Chrysotis canifrons*....2. *Formicivora griseigula*....and 3. *Spermophila parva*....—J. A. A., *The Auk*, Vol. I., p. 387, October, 1884.

MORTON, THOMAS, and ADAMS, CHARLES FRANCIS, JR.—The New English Canaan of Thomas Morton. With Introductory Matter and Notes by Charles Francis Adams, Jr. Boston: Published by the Prince Society. 1883. Sm.4to., pp. vi, 381.—Chap. IV. Of Birds and Feathered Fowles, pp. 189–199. With notes by William Brewster and the Editor.

....reprinting Thomas Morton's "New English Canaan" (published originally in 1637), with editorial notes...The technical notes on the birds, by Mr. Brewster, form an excellent commentary on the species mentioned by Morton...Morton's New English Canaan, as thus admirably edited, includes nearly everything of interest bearing upon the natural history of New England contained in these early accounts of New England...The work is limited to 250 copies, and in typography and paper is a noteworthy specimen of book-making.—J. A. A., *The Auk*, Vol. I., p. 84, January, 1884.

NELSON, E. W.—Birds of Bering Sea and the Arctic Ocean. By E. W. Nelson. Cruise of the Revenue-steamer *Corwin* in Alaska and the N. W. Arctic Ocean in 1881. Notes and Memoranda : Medical and Anthropological ; Botanical ; Ornithological. Washington : Government Printing Office. 1883. 1 vol., 4to., pp. 55, 56, 56a–f, 57–118; with 4 colored plates.

....It is a pity that so valuable and interesting a treatise as this of Mr. Nelson's should not have been more carefully printed...After some pages concisely descriptive of the region and its avifauna, the author proceeds to treat, in more or less detail, no fewer than 192 species of birds, North American with few exceptions....it is illustrated

with four colored plates, executed by Mr. [Robert] Ridgway, representing *Molacilla ocularis*, *Lanius cristatus*, *Eurynorhynchus pygmaeus* and *Cire-ronia pusilla* ...—E. C., *The Auk*, Vol. I., pp. 76-81, January, 1884.

RIDGWAY, ROBERT.—A Review of the American Crossbills (*Loxia*) of the *L. curvirostra* type. By Robert Ridgway. *Proc. Biol. Soc. of Washington*, Vol. II., 1883, pp. 84-107.

....He recognizes three races of American Red Crossbills, one of which (*L. cuvirostra bendirei*) is described as newIn North America the Red Crossbills decrease in size from the north southward ...There are also remarks on other races of Red Crossbills, particularly the *L. curvirostra* and *L. pityopsittacus* of Europe.—J. A. A., *The Auk*, Vol. II., pp. 206, 207, April, 1885.

RIDGWAY, ROBERT—Description of Several new Races of American Birds. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 9-15. Author's separates issued June 5, 1882.

RIDGWAY, ROBERT—On the genera *Harporhynchus*, *Cabanis*, and *Methriopterus*, *Reichenbach*, with a description of a new genus of *Miminæ*. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 43-46. Author's separates issued June 5, 1882.

RIDGWAY, ROBERT—Critical Remarks on the Tree-creepers (*Certhia*) of Europe and North America. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 111-116. Author's separates issued July 8, 1882.

....he proceeds to characterize seven races as susceptible of definition, three of which are for the first time named....—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 113, April, 1883.

RIDGWAY, ROBERT—Description of some new North American Birds. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 343-346. Author's separates issued Sept. 5, 1882.

RIDGWAY, ROBERT—Catalogue of a Collection of Birds made in the Interior of Costa Rica, by Mr. C. C. Nutting. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 493-502. Author's separates issued Feb. 28, 1883.

The collection reported upon was made partly at Volcan de Irazú and partly at San José....There are brief field-notes by the collector, and technical notes on a few species by Mr. Ridgway.—J. A. A., *The Auk*, Vol. I., p. 84, January, 1884.

RIDGWAY, ROBERT.—Description of a New Warbler, from the Island of Santa Lucia, West Indies. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 525, 526. Author's separates issued March 21, 1883.

Mr. Ridgway separates as a new subspecies the Warbler from Santa

Lucia, W. I., hitherto known as *Dendroica adelaidæ* under the name of *Dendroica adelaidæ delicata*....—J. A. A., *The Auk*, Vol. I., p. 83, January, 1884.

RIDGWAY, ROBERT.—Description of a supposed New Plover, from Chili. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 526, 527. Author's separates issued March 21, 1883.

(*Ægialites albidipectus*, sp. nov.) based on a single example from Chili.—J. A. A., *The Auk*, Vol. I., p. 83, January, 1884.

RIDGWAY, ROBERT.—On the Genus *Tantalus*, Linn., and its allies. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 550, 551. Author's separates issued March 21, 1883.

The genus *Tantalus* Linn., is restricted to *T. loculator*, . . .—J. A. A., *The Auk*, Vol. I., p. 83, January, 1884.

RIDGWAY, ROBERT.—Description of a New Petrel from Alaska. By Robert Ridgway. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 656–658. Author's separates issued June 26, 1883.

....(*Estrelata fisheri*, sp. nov.) from Alaska, a species most nearly allied to *E. defillipiana* Mr. Ridgway is inclined to refer also the Petrel taken in Livingston County, N. Y., identified by Mr. Brewster as *E. gularis*, to *E. fisheri*.—J. A. A., *The Auk*, Vol. I., p. 83, January, 1884.

RIDGWAY, ROBERT.—Notes upon some Rare Species of Neotropical Birds. By Robert Ridgway, Curator Department of Birds, United States National Museum. *The Ibis*, October, 1883, pp. 399–401.

The species considered are *Harporhynchus ocellatus* ScL., *Pyrranga erythrocephalus* (Sw.), *Zonotrichia quinquestrata* ScL. & Salv., *Contopus ochraceus* ScL. & Salv., and *Panyptila cayennensis* (Gm.), about which there are brief remarks respecting their affinities—J. A. A., *The Auk*, Vol. I., pp. 336, 337, October, 1884.

SEEBOHM, HENRY.—A History of British Birds, with colored Illustrations of their Eggs. By Henry Seebohm. London: Published for the author by R. H. Porter, 6 Tenterden Street, W., and Dulau & Co., Soho Square, W. Royal 8vo., Vol. I., 1883, pp. xxiv., 613, pll. 20; Vol. II., (Part 1, 1883, Part 2, 1884) pp. xxxiv., 600, pll. 22.

....The typographical execution of the work is excellent, and the plates are entitled to high praise....In respect to nomenclature and classification Mr. Seebohm is conservative to a degree approaching eccentricity, but in respect to the general subject his views are liberal, philosophic, and progressive....As regards classification Mr. Seebohm seems inclined to ignore all recent progress,....In respect to the 'vexed question of nomenclature' he has throughout his work "set the Rules of the British Association at defiance...." His panacea for the evil

is... the adoption of an '*auctorum plurimorum*' rule; ...For subspecies he adopts what may be termed a Seebohmian system of trinomials first instituted by him in his British Museum Catalogue of the Turdidæ.... As Mr. Seebohm says: "The real history of a bird is its life-history. The deepest interest attaches to every thing that reveals the little *mind*, however feebly it may be developed, which lies behind the feathers. The habits of the bird during the breeding season, at the two periods of migration, and in winter; its mode of flight and of progression on the ground, in the trees, or on the water; its song and its various call-and-alarm-notes; its food and its means of procuring it at different seasons of the year; its migrations, the dates of arrival and departure, routes it chooses, and the winter quarters it selects; and above all, every particular respecting its breeding, when it begins to build its nest, the materials it uses for the purpose, the number of eggs it lays, the variations in their color, size, and shape,—all these particulars are the real history of a bird; and in the account of each species of British birds I endeavor to give as many of them as possible."... Mr. Seebohm's work abounds in passages which invite comment ...—J. A. A., *The Auk*, Vol. II., pp. 88-91, January, 1885.

SHARPE, R. BOWDLER.—Catalogue of the Birds in the British Museum. Vol. VII. Catalogue of the Passeriformes, or Perching Birds. Cichlomorphæ: Part IV., containing the concluding portion of the Family Timeliidæ (Babbling Thrushes). By R. Bowdler Sharpe. London: Printed by order of the Trustees. 1883. 8vo., pp. i-xvi., 1-698, pll. i-xv., and numerous woodcuts in the text.

The family *Timeliidæ*, an account of which was commenced in the preceding volume [Vol. VI.], is here [Vol. VII.] completed, with the enumeration and description of 687 species.... while many ornithologists may not agree with the author in his allocation of certain forms, none, we fancy, can feel otherwise than deeply grateful to him for the very useful monograph he has placed at their disposal.—J. A. A., *The Auk*, Vol. I., pp. 278, 279, July, 1884.

SMITH, EVERETT.—The Birds of Maine. With annotations of their comparative abundance, dates of migration, breeding habits, etc. By Everett Smith. *Forest and Stream*, Vol. XIX., Nos. 22-26; Vol. XX., Nos. 1-7 and 10-13.

....Passing to water birds it is gratifying to find a better quality of work. Mr. Smith is evidently at home here, and proofs of the general accuracy of his information and judgement are numerous and unmistakable.... It is too good a paper to be wholly condemned, too faulty a one to be generously praised... Its author... has become almost an ornithologist....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., pp. 164-166, July, 1883.

STEARNS, W. A.—Notes on the Natural History of Labrador. By W. A. Stearns. *Proc. U. S. Nat. Mus.*, Vol. VI., 1883, pp. 111-137. Author's separates issued July 27 to Sept. 20, 1883.

These "Notes" relate only in part to birds, which occupy pp. 116-123. The list of birds numbers 111 species, and is briefly annotated....—J. A. A., *The Auk*, Vol. I., p. 284, July, 1884.

STEARNS, WINFRID A., and COUES, ELLIOTT.—New England Bird Life : being a Manual of New England Ornithology. Revised and edited from the manuscript of Winfrid A. Stearns, Member of the Nuttall Ornithological Club, etc. By Elliott Coues, Member of the Academy, etc. Part II. Non-oscine Passeres, Birds of Prey, Game and Water Birds. Boston : Lee & Shepard, Publishers. New York : Charles T. Dillingham. 1883. 8vo., pp. 409; 88 woodcuts.

....Dr. Coues has gone bravely on with the task of "editing" Mr. Stearns's manuscript, and the finished work, now complete in two volumes, is the gratifying result. Much that we said... of Part I. will apply equally to Part II. ... But among the Water Birds there are rather frequent evidences of hasty, and often positively incorrect conclusions New England Bird Life.... is, on the whole a wisely-conceived and admirably-executed book—by far the best, in fact, which has been so far published on New England birds....—W. B., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 161-164, July, 1883.

STEJNEGER, LEONHARD.—Synopsis of the West Indian *Myiadestes*. By Leonhard Stejneger. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 15-27, pl. ii. Author's separates issued June 5, 1882.

Eight species are recognized, two of which (*M. sanctaeluciae*, *M. dominicanus*) are described as new.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 170, July, 1883.

STEJNEGER, LEONHARD.—On some generic and specific appellations of North American Birds. By Leonhard Stejneger. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 28-43. Author's separates issued June 5, 1882.

Proposing to use "the oldest available name in every case" the author shows that many of our current names must give way if the "inflexible law of priority" is to be observed. For ourselves we believe that the surest way out of the nomenclatural difficulties that beset us is to be found in some such simple rule as this.... Still such a paper as this makes us wish... that some counteractive "statute of limitation" could come into operation... Stejneger's points seem to be well taken in the main; and... we presume the restrictions and substitutions he proposes are available if not indeed necessary under the priority statute.... E. C., *Bull. Nutt. Ornith. Club*, Vol. VII., pp. 178, 179, July, 1882.

STEJNEGER, LEONHARD.—Outlines of a Monograph of the Cygninæ. By Leonhard Stejneger. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 174-221, figg. 16. Author's separates issued July 25, 1882.

The external and osteological characters are given in detail, with diagnoses of the genera and species... the author recognizes four genera of Swans, namely *Sthenelus* (gen. nov.), *Cygnus*, *Olor*, and *Chenopsis*. The two North American species are assigned to *Olor*.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 231, October, 1883.

STEJNEGER, LEONHARD.—Remarks on the Systematic Arrangement of the American Turdidæ. By Leonhard Stejneger. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 449–483, with numerous cuts. Author's separates issued February 13, 1883.

....Dr. Stejneger's synopsis of the family extends only to the genera and higher groups as represented in America. The generic synonymy is fully given, and the generic diagnoses are supplemented by general remarks and figures illustrative of the principal generic characters.—J. A. A., *The Auk*, Vol. I., pp. 181, 182, April, 1884.

TOWNSEND, CHARLES H.—Notes on the Birds of Westmoreland County, Penna. By Charles H. Townsend. *Proc. Acad. Nat. Sci. Philadelphia*, 1883, pp. 59–68.

"The species enumerated represent perhaps not more than two-thirds of the actual birds of Westmoreland County"....The list, numbering 136 species, is rather too sparingly annotated...but we are led to hope that this may be the forerunner of a fuller report.—J. A. A., *The Auk*, Vol. I., p. 184, April, 1884.

TUELON, JAMES A.—List of Birds observed near Bradford, Pa., by James A. Tuelon. *Quarterly Jour. Boston Zool. Soc.*, Vol. IV., January, 1883, pp. 8–11.

As the whole number is only 77, without exception very common and well-known species, and as the annotations are of no special consequence, the reason why the list is printed is not evident.—E. C., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 171, July, 1883.

TURNER, LUCIEN M.—On *Lagopus mutus*, Leach, and its Allies. By Lucien M. Turner. *Proc. U. S. Nat. Mus.*, Vol. V., 1883, pp. 225–233. Author's separates issued July 29, 1882.

The author believes....that the European birds *mutus* and *alpinus* constitute "but a single species having the name *Lagopus mutus* Leach, while the American bird...to be called *Lagopus mutus rufestris* (Gm.) Ridg. Four races are recognized...Detailed descriptions and measurements are given of a considerable number of specimens of each race.—J. A. A., *Bull. Nutt. Ornith. Club*, Vol. VIII., p. 232, October, 1883.

WILLARD, S. W.—Migration and Distribution of North American Birds in Brown and Outagamie Counties. By S. W. Willard. De Pere, Wis., 1883, 8vo., pp. 20.

....The paper gives evidence of careful observation, and is a valuable contribution to our knowledge of the manner of occurrence and movements of the birds of the area in question.—J. A. A., *The Auk*, Vol. II., pp. 289, 290, July, 1885.

NOTE.—Publication of Part II. of this paper is deferred to a succeeding number of these 'Abstracts.'

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ERRATA.

Page 12, line 20, for "*Didelphis virginianus*," read "*Didelphis virginiana*."

Page 26, lines 12 and 13, for "San Sebastion," read "San Sebastian."

Page 26, line 2 of the third foot-note, for "Dr. Merrian," read "Dr. Merriam."

Page 27, line 18 of foot-note, for "Berkely," read "Berkeley."

Page 40, line 4, for "21 species and 12 subspecies," read "26 species and 13 subspecies."

Page 40, lines 15 and 16, for "23 species and 16 subspecies, under several subgeneric subdivisions," *dele* the last four words, and read "18 species and 8 subspecies."

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1894-95.

No. 7.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

For the Year Ending March 26, 1895,

WITH

NOTES ON CUBAN MAMMALS,

BY JUAN GUNDLACH,

AND

SALAMANDERS FOUND IN THE VICINITY OF
NEW YORK CITY, WITH NOTES UPON
EXTRA-LIMITAL OR ALLIED
SPECIES,

BY WILLIAM L. SHERWOOD.

*The Society meets on the second and fourth Tuesday
evenings of each month at the American Museum of Natural
History, Central Park, New York City.*

PUBLICATIONS OF The Linnæan Society of New York.

TRANSACTIONS.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPIECE—PORTRAIT OF LINNÆUS.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTH-EASTERN NEW YORK. By CLINTON HART MERRIAM, M.D.

General Introduction. Mammalia: Carnivora. Biographies of the Panther, Canada Lynx, Wild Cat, Wolf, Fox, Fisher, Marten, Least Weasel, Ermine, Mink, Skunk, Otter, Raccoon, Black Bear, and Harbor Seal.

IS NOT THE FISH CROW (*Corvus ossifragus* Wilson) A WINTER AS WELL AS A SUMMER RESIDENT AT THE NORTHERN LIMIT OF ITS RANGE? By WILLIAM DUTCHER.

A REVIEW OF THE SUMMER BIRDS OF A PART OF THE CATSKILL MOUNTAINS, WITH PREFATORY REMARKS ON THE FAUNAL AND FLORAL FEATURES OF THE REGION. By EUGENE PINTARD BICKNELL.

New York, December, 1882.

Price: Paper, - \$2.00. Cloth, - \$3.00.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume II., Royal Octavo, 233 pp. Contents: FRONTISPIECE—PLATE OF BENDIRE'S SHREW.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTH-EASTERN NEW YORK. (MAMMALIA CONCLUDED.)

By CLINTON HART MERRIAM, M.D.

Contains Biographies of the Deer, Moose, and Elk; of the Moles and Shrews (six species); the Bats (five species); the Squirrels (six species); the Woodchuck, the Beaver, the Porcupine, the House and Field Rats and Mice (seven species), and the Hares (three species).

DESCRIPTION OF A NEW GENUS AND SPECIES OF THE SORECIDÆ. (*Atophyrax Bendirii*, with a plate.)

By CLINTON HART MERRIAM, M.D.

New York, August, 1884.

Price: Paper, - \$2.00. Cloth, - \$3.00.

Abstract of Proceedings.

ABSTRACT OF PROCEEDINGS OF THE LINNÆAN SOCIETY OF NEW YORK

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|--------|------------------------------------|-------|--------------|-----------|
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ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK,

FOR THE YEAR ENDING MARCH 26, 1895.

This is the seventh in the series of "Abstracts" published by the Society and, like the preceding numbers, is intended mainly as a brief review of the year's work, only the more important points in the papers read before the Society being mentioned. Some of the papers have been printed in full elsewhere, and in such cases a reference is given to the place of publication.

April 3, 1894.—Public lecture in the lecture hall of the American Museum of Natural History, by D. G. Elliot, F. R. S. E., on "Domestic Fowls and Pigeons," with stereopticon illustrations.

April 10, 1894.—The President in the chair. Six members and one visitor present.

The Auditing Committee reported that it had examined the Treasurer's report and found it correct.

Resolutions favoring a reduction of postal rates on scientific specimens were carried unanimously.

J. L. Wortman, M. D., presented a paper entitled "Some Points on the Probable Origin of the Seals." His remarks

were based upon the extinct animal *Patriofelis*, a skeleton of which was discovered in the Eocene deposit of southern Wyoming, in 1893. He referred to certain characters in the Seals which indicate that they have no relationship with any existing animal, and also mentioned several characteristics which are common to the Seals and to *Patriofelis*.

April 24, 1894.—The President in the chair. Six members and eleven visitors present.

Fifteen dollars were contributed by the Society to the fund then being raised by Mr. William Dutcher, for the protection of the Terns on Great Gull Island, Suffolk County, New York, during the breeding season of 1894, and suitable resolutions were passed.

William C. Braislin, M. D., read a paper entitled "Birds Observed in Prospect Park, Brooklyn, New York, during the winter of 1893-4." Seventeen species were included in the list.

Mr. L. S. Foster read a list of birds observed by him during a recent trip to southern New Hampshire. There were notes on fifteen species.

May 8, 1894.—The President in the chair. Five members and four visitors present.

The President, in accordance with a vote taken at the previous meeting, appointed a Committee on the Local Fauna, as follows, viz.: L. B. Bishop, M. D., William C. Braislin, M. D., F. M. Chapman, Jonathan Dwight, Jr., M. D., L. S. Foster, W. W. Granger, A. H. Howell, H. C. Oberholser, William C. Rives, M. D., and L. B. Woodruff.

Mr. J. M. Pray presented a paper entitled "Individual Variation in Birds, with Reference to its Bearing on their Psychological Development." The author considered that, psychologically speaking, birds and man have many attributes in common. He quoted to some extent from the unpublished writings of Mrs. Anna H. Read, describing the habits of various familiar species of birds as observed at Elizabeth, New Jersey.

Dr. Allen read a letter from Mr. H. W. Henshaw, giving

an account of the nest-building of a pair of Crimson House Finches (*Carpodacus frontalis rhodocolpus*) at Witch Creek, California. These birds guyed their nest, containing five eggs, which being insecurely placed would otherwise have been in danger of destruction by the prevailing strong winds. [See "Auk," Vol. XI., 1894, pp. 255, 256.]

Mr. F. M. Chapman gave interesting notes concerning his recent West Indian trip. He said that, on May 6, when about eighty miles off Barnegat, New Jersey, he had seen large flocks of the Northern Phalarope (*Phalaropus lobatus*), and also two specimens of the Long-tailed Jaeger (*Stercorarius longicaudus*).

May 22, 1894.—The Vice-President in the chair. Ten members and fourteen visitors present.

Mr. F. M. Chapman presented a paper entitled "Notes on a Second Visit to the Island of Trinidad," illustrated by numerous specimens. He gave a sketch of the animal life of the islands visited by him, which was particularly detailed regarding Trinidad.

June 12, 1894.—The Vice-President in the chair. Eight members and five visitors present.

Mr. H. C. Oberholser read a paper on "The Red-shouldered Hawk in Captivity." He related his experience in regard to the actions and food-habits of this species, of which he had had a number in captivity in Ohio.

Mr. A. H. Howell mentioned the capture of an Acadian Flycatcher (*Empidonax acadicus*) on Long Island, during the Spring migration. [See "Auk," Vol. XI., 1894, pp. 82, 83.]

Mr. L. S. Foster read a list of thirty-five birds observed by him in Westchester County, New York, on May 30, 1894.

Mr. F. M. Chapman remarked upon the Tufted Titmouse (*Parus bicolor*) as a permanent resident on Staten Island. Several of the members present regarded the bird as very rare on Long Island.

The occurrence of *Cicada septemdecim* in this vicinity at present was mentioned.

October 9, 1894.—The Vice-President in the chair. Six members and two visitors present.

Mr. F. M. Chapman read a paper entitled "Notes on Cuban Mammals," by Juan Gundlach, Ph. D. Much interesting information concerning the various species of mammals was given, and the remarks on *Solenodon* were especially valuable. The paper was illustrated by specimens from the American Museum collections. (Printed in this Abstract, *postea*, pp. 13-20.)

October 23, 1894.—The President in the chair. Thirteen members and eight visitors present.

The following report by Mr. William Dutcher concerning the protection of the Terns on Great Gull Island, was read :—

"I take pleasure in reporting, that during the season of 1894, protection was given to the colony of Terns, on Great Gull Island, N. Y., during the breeding season. In 1886, the Island was visited and a colony of from three to four thousand Terns was found there. It was ascertained that it was a common practise for persons to visit the Island and shoot the birds, and take the eggs for various purposes, principally, however, for eating. Subsequently it was ascertained that the colony was decreasing year by year, and the necessity for protection became apparent, if the colony was not to be entirely destroyed as has been the result elsewhere on the Long Island coast. The matter was brought to the attention of the Linnæan Society of New York, at a meeting held April 24th, 1894, when the following resolutions were unanimously adopted :

"Whereas, It has been brought to the attention of this Society that the Terns breeding on Great Gull Island, Long Island, N. Y., are threatened with complete extermination unless measures are promptly taken for their protection during the breeding season, and it having been made known to this Society that Mr. Wm. Dutcher of this city is willing to undertake to secure for them the necessary protection, provided the co-operation and pecuniary assistance of this Society can be obtained. Therefore, be it

“Resolved; That this Society hereby appropriates the sum of \$15.00 towards a fund to be raised by Mr. Dutcher, for the purpose of securing the services of a special game keeper for the protection of the Terns on Gull Island, and gives its hearty approval of his laudable enterprise in behalf of the preservation of these beautiful, harmless and much persecuted birds.

(Signed)

WALTER W. GRANGER,
Secretary.

“The matter was also presented to the West Side Natural History Society of New York, and the American Society for Prevention of Cruelty to Animals. These societies and some private individuals subscribed a fund sufficient for a salary to a special game keeper. Great Gull Island is some distance from the Long Island and Connecticut shores; is somewhat difficult of access, and is not large enough, (being about twelve to fifteen acres in extent), to permit a game keeper to reside on the Island. It was therefore necessary to secure the co-operation of the Light House Board at Washington, D. C., and its permission that the keeper of the Little Gull Island Light-house should act in the capacity of game keeper. The matter being presented to the Board its consent was given as follows:

“In reply to the request in your letter of May 5, 1894, the Light-house Board informs you that it sees no objections to the employment, by your society, of the keeper of Little Gull Island Light-house Station, N. Y., to protect Tern near Little Gull Island during the breeding season. Authority to employ this keeper for that purpose is granted, with the proviso that it is not to interfere with his duties as Light-house keeper.

“You are requested to communicate with Captain W. S. Schley, Inspector of the Third L. H. District, Tompkinsville, Staten Island, N. Y., on the subject and inform him of the action of the Board.

Respectfully yours,

(Signed),

R. D. EVANS,
Capt. U. S. Navy
Naval Secretary.

“After securing the consent of the Light-house Board, that Capt. Field should serve as game protector, his appointment by the Game Commissioners was requested by the New York Association for the Protection of Game in the following letter :

"It has been shown conclusively to us that the colony of Terns breeding on Great Gull Island, Suffolk County, N. Y., is in danger of extermination, and is in need of State protection. We, therefore, petition your honorable body to appoint Henry P. Field, Keeper of Little Gull Island Light-house, Suffolk County, (P. O. Address, Sag Harbor), N. Y., as special game protector for Great Gull Island, his appointment to be without compensation on the part of the State, and to last from May 15th to September 15th, 1894.

Very respectfully yours,

(Signed),

WAKEMAN HOLBERTON,

Secretary,

New York Assoc. for Protection of Game.

"On this application Capt. Field was appointed as Special Game Protector, and acted as such during the breeding season of 1894. In a letter received from him on the 4th of October, he states that the colony of Terns has increased wonderfully during the past season, and he submits a list of dates when he prevented parties from collecting eggs and shooting birds.

"In reply to an inquiry he stated that he estimated the increase to be from 1,000 to 1,500 birds, or that the colony had increased in numbers at least one half. That this statement is correct is undoubtedly true, for, on numerous occasions, while sailing off the south side of Long Island this year, I observed Terns for the first time in a number of years, and a correspondent informs me that he saw flocks of Terns on Long Island as far west as Flushing Bay during the past season, none having been seen there before for a number of years.

Very truly,

WM. DUTCHER.

"NEW YORK, Oct. 23, 1894.

The paper of the evening, "Peculiar Phases of Color assumed by Certain Birds," by R. W. Shufeldt, M. D., was, in his absence, read by the Secretary:

Mr. L. S. Foster read, from the recent compilation made by the Committee on the Local Fauna, the published records concerning the thirty-two species of Raptores found in the vicinity of New York City.

November 27, 1894.—The Vice-President in the chair. Seven members and eight visitors present.

Jonathan Dwight, Jr., M. D., read a paper on "The Flora and Fauna of Sable Island." His remarks were based upon observations made by himself on the island during a period of sixteen days, the closing days of May, and the beginning of June, 1894. He found three species of Terns—the Common Tern (*Sterna hirundo*), the Arctic Tern (*Sterna paradisæa*), and the Roseate Tern (*Sterna dougalli*)—on the island; the Common and Arctic Terns were exceedingly abundant, breeding in great numbers at many places along the shore. The Ipswich Sparrow (*Ammodramus princeps*) was tolerably abundant and was breeding, and Dr. Dwight collected the first authentic nests with eggs of this species.

December 11, 1894.—The President in the chair. Five members and four visitors present.

The Lecture Committee presented a formal report through Dr. J. A. Allen, the chairman, stating that arrangements had been completed for a course of four lectures to be given in the lecture hall of the American Museum, as follows:

1. January 8, 1895. "A Trip through the Lesser Antilles," by Frank M. Chapman.
2. February 5, 1895. "The Great West a Half Million Years Ago," by Henry Fairfield Osborn, Sc. D.
3. March 12, 1895. "Hawaii, the Paradise of the Pacific," by William Libbey, Jr., Sc. D.
4. April 2, 1895. "Ancient Earthworks in the Ohio Valley," by Prof. Frederic W. Putnam.

A paper by Mr. R. L. Ditmars was entitled "Notes on the Genus *Crotalus* (Rattlesnakes), with a Brief Review of the Genus." Mr. Ditmars stated the distribution of the genus *Crotalus* in the United States, and gave notes upon a live specimen which he had kept in captivity for over three years. His remarks upon the secretion of venom and exuviation by the various species were especially full.

December 29, 1894.—The Vice-President in the chair. Six members and one visitor present.

Mr. W. W. Granger presented remarks on "The Mammals of the Black Hills and Vicinity." These notes were based upon a collection of about twenty species of small mammals, made by Mr. Granger during the summer of 1894. The collection embraced the following species described as new to science by Dr. J. A. Allen¹:—*Neotoma campestris*, *N. rupicola*, *N. grangeri*, *Sciurus hudsonicus dakotensis*, and *Arvicola insperatus*. Protective coloration was graphically indicated by specimens from the barren "Bad Lands," and from the deep pine forests of the Black Hills.

January 8, 1895.—Public lecture in the lecture hall of the American Museum of Natural History, by Mr. Frank M. Chapman, entitled "A Trip through the Lesser Antilles," with stereopticon illustrations.

January 22, 1895.—The President in the chair. Six members and ten visitors present.

J. A. Allen, Ph. D., presented a paper on "The Mammals of Southern Arizona." This paper was based on a collection of about fifteen hundred mammals, made in southeastern Arizona, by Mr. W. W. Price, of the Leland Stanford University, and containing seventy species, of which ten have been described as new to science by Dr. Allen. Specimens of nearly all the species mentioned were shown. [See Bull. Am. Mus. Nat. History, Vol. VI., 1894, pp. 317-322, 347-350, and Vol. VII., 1895, pp. 193-258.]

Mr. S. H. Chubb stated that he had seen a flock of about one hundred Cowbirds (*Molothrus ater*) at Bryn Mawr Park, New York, on December 31, 1894.

February 5, 1895.—Public lecture in the lecture hall of the American Museum of Natural History, by Henry Fairfield Osborn, Sc. D., entitled "The Great West, a Half Million Years Ago," with stereopticon illustrations.

¹ Bull. Am. Mus. Nat. Hist., Vol. VI., 1894, pp. 322-326.

February 12, 1895.--The Vice-President in the chair. Eight members present.

A Committee was appointed to draft resolutions upon the recent death of George N. Lawrence, an Honorary Member of the Society.

Louis B. Bishop, M. D., presented two short papers, "*Aythya marila* or *Aythya marila nearctica*?" and "An Apparently Undescribed Plumage of the Surf Scoter." [See "Auk," Vol. XII., pp. 293-297.]

Mr. L. S. Foster mentioned the capture of a Black-capped Petrel (*Æstrelata hasitata*) at New Paltz, Ulster County, New York, on January 26, 1895. [See "Auk," Vol. XII., 1895, p. 179.]

William C. Braislin, M. D., stated that he had captured a Savanna Sparrow (*Ammodramus sandwichensis savanna*) at Flatbush, New York, on January 30 1895, and that he had observed a Phœbe (*Sayornis phæbe*) at Crosswicks, near Trenton, New Jersey, on December 26, 1894.

February 26, 1895.--The President in the chair. Ten members and eight visitors present.

The committee to draft resolutions upon the death of George N. Lawrence, reported as follows :

"Mr. George Newbold Lawrence, the eminent American ornithologist, and an Honorary Member of this Society, died at his residence in New York City, on January 17, 1895, in his eighty-ninth year. For nearly fifty years he devoted his leisure from business pursuits to ornithological investigations, forming a collection of tropical American birds almost unrivalled in extent outside of public museums.

"This collection, now the property of the American Museum of Natural History, will prove of inestimable service to science, containing, as it does, not only the types of most of his own species, but consisting of material now historic, from having been the basis of his work and carrying with it his identifications. So that, while death has removed him from earthly associations, his works will long prove a blessing to those laboring in his chosen field.

"To students of North American ornithology he is best

known for his contributions to Professor Baird's great work on North American birds, published in 1858, and forming Volume IX. of the Reports of Explorations and Surveys for a Railroad Route from the Mississippi River to the Pacific Ocean, conducted by the War Department of the United States, the parts relating to the Longipennes, the Totipalmi and the Brachypteri being from the pen of Mr. Lawrence. Aside from this, his published writings, numbering some 120 titles, relate mainly to the birds of Mexico, Central America, South America and the West Indies, of which he described over 300 species as new to science.

"Mr. Lawrence was an associate and friend of Audubon, and at the time of his death formed almost the last link of the chain connecting the earlier ornithologists with the workers of to-day. He was not only one of the founders of the American Ornithologists' Union and one of its first Councillors, but in 1890 received the distinction of being the first, and thus far the only, American ornithologist elected to Honorary Membership in that body. His attainments were widely recognized abroad, he having been elected to honorary or corresponding membership in many foreign societies and academies, as well as to those of his own country.

"Personally he was endeared to his many friends and scientific associates by his modesty and great amiability of character. Although of late years he was rendered comparatively inactive in the scientific field by the infirmities of advanced age, his memory will be long cherished, not only among ornithologists, but by those privileged to have been honored with his personal acquaintance. His interest in ornithology was developed at an early age, and, later intensified and stimulated by his life-long intimacy with the late Professor Baird, was as keen during the later months of his life as at earlier periods."

(Signed.)

L. S. FOSTER,
J. A. ALLEN,
FRANK M. CHAPMAN,
Committee.

Mr. Frank M. Chapman presented the paper of the evening, "The Study of Ornithology." Mr. Chapman spoke of the classification of birds, of the modifications produced by environment, and of the economic side of ornithology, and urged the present need of a knowledge of the living birds rather than further collecting of specimens.

March 12, 1895.—Public lecture in the lecture hall of the American Museum of Natural History, by William Libbey, Jr., Sc. D., on "Hawaii, the Paradise of the Pacific," with stereopticon illustrations.

March 26, 1895.—Annual Meeting. The President in the chair. Thirteen members and nineteen visitors present.

The Secretary presented his annual report, as follows :

"There have been held during the past year 14 meetings of the Society, at which the average attendance of members was 7 and of visitors 6.

"The membership of the Society has increased from 3 Honorary, 136 Resident, and 35 Corresponding members—a total of 174—to 2 Honorary, 150 Resident, and 37 Corresponding members—a total of 189.

"The members lost by death during the year are George Dexter Bradford, Frederick H. Hoadley, George N. Lawrence, and P. C. Tiemann.

"There have been read before the Society 16 papers, of which 9 related to ornithology and the remainder chiefly to mammalogy.

"The Society has issued 'Abstract of Proceedings, No. 6,' to which are appended a paper on 'Recent Progress in the Study of North American Mammals,' by Dr. J. A. Allen ; 'A Consideration of Some Ornithological Literature, with Extracts from Current Criticism, Part I,' by Mr. L. S. Foster ; and an index,—making a pamphlet of 104 pages. The usual distribution to members and the exchange list was made."

The Librarian presented his annual report as follows :

"During the past year the additions to the library of the Society have numbered 413 publications. It now consists of 1,287 issues.

"No recent work in indexing the library has been possible, but attention is called to the fact that more than ten thousand references to authors and subjects are at the service of those desiring to consult its valuable scientific material."

The Treasurer presented his annual report, showing a balance on hand of \$202.97.

The Committee on the Local Fauna reported as follows :

"The committee has addressed itself to the task of tabulating by species the published records of the birds occurring within fifty miles of New York City.

"From 212 papers, by 88 authors, 3,364 citations concerning 388 species were obtained, and are now available to students.

"In addition to this, a large amount of work has been done on a map of the region."

The Committee for Conference with other New York Scientific Societies and the Committee on Finance submitted reports.

The following officers were elected for the ensuing year :

President, J. A. Allen, Ph. D.

Vice-President, Mr. Frank M. Chapman.

Secretary, Mr. Walter W. Granger.

Treasurer, Mr. L. S. Foster.

Mr. Stephen A. Krom presented a paper entitled "The Turkey Vulture (*Cathartes aura*), with Notes on a Specimen taken at Plainfield, New Jersey." After describing the characteristics of this species and exhibiting two maps, one of which indicated its range in New Jersey and vicinity, and the other its occurrence in North America, Mr. Krom gave extended remarks upon its distribution, breeding area, nest, eggs, plumage, size, flight, and sense of smell and sight. The specimen referred to was taken at Plainfield, New Jersey, on June 30, 1894. [See "Auk," Vol. XII., 1895, p. 80.]

Mr. William L. Sherwood presented remarks on "Salamanders; with Special Reference to Those Found near New York City." [Printed in this Abstract, *postea*, pp. 21 *et seq.*]

Notes on Cuban Mammals.¹

BY DR. JUAN GUNDLACH.

Chiroptera.—Of the twenty species of Bats observed by Dr. Gundlach, in Cuba, nineteen have been recorded by him in his paper entitled “Contribucion á la Mamalogia Cubana.”² He places them in two groups, as follows: I. Species with a nose-leaf or with fleshy wrinkles over the nostrils or around the mouth. These hang themselves during the day by the hind-legs. They eat insects and fruit. The following genera are included: *Macrotus*, *Monophyllus*, *Phyllonycteris*, *Artibeus*, *Phyllops*, *Brachyphylla*, *Mormops*, *Chilonycteris*, *Noctilio*. II. Species without a nose-leaf and with no wrinkles about the mouth. These sleep in crevices and do not hang themselves by the hind-feet. They eat only insects. The following genera are included: *Molossus*, *Nyctinomus*, *Natalus*, *Vesperus*, *Nycticejus*, *Atalapha*.

SOLENOTODON *Brandt*.

Mr. Brandt, member of the Academy of St. Petersburg, published in the year 1833 in the “Memoires de l'Academie de St. Petersburg,” Vol. II., p. 459, the description of the genus *Solenodon*, with the species *paradoxus*, a male of which was sent to him from Haiti. No other examples seem to have been sent to naturalists.

Professor Poey, of the University of Havana, gave notice

¹ The part relating to the Chiroptera has been abridged; the remainder of the paper is given in full, as written.

² *Annales de la Real Académiá de Ciencias médicas, físicas, y naturales de la Habana*, 1877.

of the existence of a *Solenodon* in the island of Cuba, in the paper "El Plantel," in the year 1838. The species was found in the mountains between Cienfuegos and Trinidad, in the estates of Buenas-Ayres, Naranjos, and Cimarrones, as ascertained by the French Consul Lavallie in Cienfuegos, but he did not see the animal, and it has not been observed there since; at least no naturalist has been able to procure a specimen in that locality. I do not say that the species does not exist in the region; for, being myself in the mountains of Trinidad in 1856, I was told by a countryman that the species existed there, and that he had himself seen it; and, as he gave me an exact description of the animal, I believe that he really saw it. The only discrepancy in the description he gave of the animal, consisted in the color of the hair, which he said was grayish, which is not the color of the species in the eastern part of the island.

The first notice that Poey had of *Solenodon* was a skull, received from Mr. Andres Porey Iacome, of Guanabacoa, which had been sent to him from Bayamo. After having asked for information of Macleay, of London, from Brandt's work, and also from Mr. Guérin, of Paris, he published an article in the "Plantel." Poey received afterwards some living individuals from Mr. Rafael Zenea, of Bayamo, which individuals were destined to the Royal Economic Society of Havana. One of these individuals is represented in the engraving of the first volume of Poey's "Memorias." Zenea, as well as Poey and myself, says that in day-time they slumbered, hiding their heads if possible, and at night were quite lively, occasionally screaming; it screamed in the same way when I killed it.

After Mr. Poey's publication in the "Plantel," Mr. Gervais mentions the species in a note in La Sagra's work, "Historia fisica, politica y natural de la Isla de Cuba," but only gives its name.

Poey published later an extensive treatise, with a colored engraving, in his "Memorias," I., p. 23.

I afterwards sent a female in alcohol to the Society of Natural History of Cassel (electorado Hessen), and from thence it was sent to the Museum of Berlin, where the Director of the same, Dr. Peters, made a study of it, which was published in the "Abhandlung der königlichen Akademie der Wissenschaften in Berlin, 1863," with three engravings, representing the animal, its skeleton, and some interior and exterior parts of the same; the engraving of the animal is colored. He found some differences between the examples from Cuba and the one from Haiti, received for comparison from St. Petersburg, and for this reason named the former *Solenodon cubanus*.

In the same year I sent two examples to Washington. Of these, one is still at the Smithsonian Institution and Professor Baird sent the other to England.

The genus is found in the Sierra Maestra, south of Bayamo, and from there Professor Poey and myself have both received several individuals, presented to us by Dr. Manuel Yero; and it is also said to exist in the mountain near Sagua de Tanamo and Mayarí, for having once taken a live individual to the coffee plantation Iaguey, in the District of Yateras, some of the men working there, natives of Sagua de Tanamo, said they had seen the animal there, when they saw mine.

In the year 1857, I went to Bayamo, to the coffee-plantation Buena-Vista, south of Bayamo, from whence Yero had received the individuals he had given me. There I went with a wood-keeper to the highest part of the mountain and met with evident signs of the existence of the animal in places where it had been scratching the soil in search of food (worms and insects), and I also saw holes made by the animal in which it lives during the day-time. In order to get the animal it is necessary to dig to the bottom of the hole or cave, and this is sometimes a very hard task, where the roots of large trees render the digging difficult. Though the *Solenodon* is not very rare, yet it is not easy to procure one, and when desired, a high price must be

paid for it. In 1885 or 1886, Professor Baird of the Smithsonian Institution, and Dr. Reynoso, director of the Institute at Havana, desired some individuals, and for three of these seventy-three dollars were paid. Of these three, I prepared one for the Havana Institute, the other two were sent to Washington, one in alcohol and the other alive. The two arrived safely and the living one was sent to the Zoölogical Garden of Philadelphia, where it was kept until it died. After that I received from Mr. Yero (son of Dr. Yero), a few more individuals, one of which was given to the Academy of Sciences, medicals, fisicals, and naturals of Havana, another to the University of Havana, one was sent to the Museum of Bremen, one to the Museum of Geneva, Switzerland; two to Paris; of another I prepared a skeleton for the Institute of Havana, and a male and a very young one I sent in alcohol to Berlin, to Dr. Peters, for the continuation of his monograph, but he died before completing it.

My friend, Mr. Ramsden, the English Consul at Santiago de Cuba, procured a specimen which he sent in alcohol to England, and Don Francisco Timeno, of Matanzas, received a specimen from a friend for his collection.

I have received no examples since 1889. I have asked for one for Mr. Cory and another for the American Museum of Natural History in New York.

The names Tamache at Cienfuegos and Tejon, at Bayamo cannot be kept for the species, because the name Tamache is (if I am well informed) that of a Mexican animal and quite different, and Tejon is the *Meles taxus* of Europe, a large plantigrade animal. The name Andaras, mentioned in Peters' treatise, page 19, as used in Guisa and the Sierra Maestra, belongs to the species *Capromys melanurus* Poey. The name Aire given by Oviedo is improper and not to be admitted. The name Almiqui given by Prof. Poey, saying it is the name of a mountain, is the name of a tree, *Mimusops taimiqui*, and probably not of a mountain. Dr. Peters, in a note on page 19, says that the name Mira-

guane on the label is the name of the Haitian species, but it is the name of the locality where it was found.

The name *Solenodon* is composed of two Greek words and means "teeth with a channel," because the second incisor tooth of the inferior mandible is large and has a channel on the inside. The channel seems to be the conductor of a liquid which is perhaps poisonous. Dr. Peters did not find glands in connection with the teeth. I was once bitten by the animal in the finger with the channelled incisors and the wound swelled; but this happened also with the bite of other animals in anger. I was always able to touch and remove it to clean the cage without any assistance except in the case mentioned.

My friend Yero, who had kept several examples in a room, viz.: a female with two very young ones, that held tight to the mammæ of the mother while it went around the room. I have observed that the extremity of the mamma was harder than its base and this probably aided the young ones in holding to them.

I have also seen female bats flying away, frightened, with their little ones hanging on their breast.

The animal erected the hair on its back, when in anger or when a dog happened to come near it. It could be fed with raw meat cut into very fine strips of the shape of worms, or with little pieces of birds intestines, with insects or earth worms.

The color of the fur varies somewhat, but the most common is the one given in the engravings published by Poey and Peters.

Dr. Peters gives the differences of the two species: the length of the hair of the back is in *S. paradoxus* 35 milimetres, and in *cubanus* 75 milimetres, and the nostrils are situated in the border and near the extremity of the head, in *cubanus* and in *paradoxus* are below; they are separated on the underside in *paradoxus* for a broader space.

CAPROMYS *Desmarest.*

There are only three species of *Capromys* in Cuba. The

largest is *Capromys fournieri* Desmarest. It lives upon the trees, between the branches, or upon parasitic plants, or in holes between the rocks, when trees are lacking. They go up the trees, climbing the vines growing on them, or by going up the aerial roots of the Iaguey (*Ficus*), Copey (*Clusia*), etc. It is named all over the western part of the island "Hutia Congo," and in the mountain of Guantánamo it is known by the name of "Hutia de ramas" (Hutia of the branches). It received the name Congo because individuals caged can be easily tamed, like the Congo Negroes. In the islets near Cárdenas I procured a black variety, called there Hutia Mandinga, because the Mandinga Negroes are very black. I suppose that the eating of the leaves of the Mangrove (*Rhizophora*), which contains much tannin, is the cause of its black color. Some perfect albinos, or spotted with white, are occasionally found. Its food is vegetable, and I doubt, as la Sagra states, that it eats lizards also.

Its tail is short, straight, and covered with short hairs.

The second species is the *Capromys prehensilis* Poeppig = *Capr. poeyi* Gervais, called in the western part of Cuba "Hutia Carabali," and in the mountains of Trinidad "Hutia Mona" (Monkey Hutia). The name Carabali is given because caged individuals are not easily domesticated, and will not eat when captured, resembling in this the Carabali Negroes; the name Hutia Mona is given because the end of the tail has a prehensile character. It lives generally in hollow trees, and where these are wanting, it lives on the branches. I have never seen it in stony holes or caves.

Mr. Poeppig called it *prehensilis* on account of its long tail, which it can twist and hang by it in some way, but not as the American monkeys do with their tail. Mr. Guérin-Menneville called the species *Capromys poeyi*, probably because he did not know that it had already been named, and Poey would not accept the name *prehensilis*, because the peculiar character of Poeppig's description consisted in the statement that the end of the tail undermost was hairless, when the truth is that the end had been worn

out. This species exists only in the western part of the island.

The third species is the *Capromys melanurus* Poey, called Andaraz in Bayamo and Hutia de hoyo (in hollows) in the mountain of Guantánamo. It lives in the eastern part of the island, in the holes in trees. This species has a short tail, like the Hutia Congo; its extremity is not prehensile, and is covered with pretty long black hairs.

Negroes and countrymen are fond of the flesh of *Capromys furnieri*; the flesh of the other two species is not esteemed. The surface of the liver of *Capromys furnieri* is wrinkled, as represented by Gervais in la Sagra's work, and I believe also by Dobson. The liver in *Capr. prehensilis* and *Capr. melanurus* is smooth.

MUS Linné.

There are three species of this genus in Cuba. Dr. Peters has classified the individuals sent by me as *Mus decumanus*, *rattus* and *musculus*. Mr. Chapman, in his "Notes on Birds and Mammals observed near Trinidad, in Cuba," mentions two species, *M. tectorum* and *musculus*. I suppose that *M. tectorum* is the same species named *rattus* by Dr. Peters, because it lives on trees, in the upper parts of houses, and in the roofs of rural houses when covered with palm-leaves. On trees it lives in holes, or, if these are lacking, in a globular nest with a lateral entrance, formed of leaves and fine twigs. It is named Raton.

The species *M. decumanus* Pallas, Rata, lives almost always in holes made in the ground, in sinks and drains.

It is omnivorous, very noxious, especially in the sugar-cane fields, where it kills the plant by biting it; it also kills and eats domestic fowls and eggs, and also eats the food in houses, etc. When the Rats are in danger they sometimes attack persons. On the back some stiffer and blackish hairs may be seen. The fur of the Rat is of a grayish-brown on the upper parts, lighter on the sides and white on the under parts; and in the Raton the fur is above

dark gray, lighter on the sides and white on the under parts. The Rat is the largest species, and the smallest is *Mus musculus* Linné, named Ratoncito or Guayabito. It lives everywhere in houses and in fields. It is very noxious in the houses, not so much for eating the victuals as for gnawing the clothes, furniture, boxes and baskets containing victuals.

The genus *Mus* forms no part of the fauna of Cuba. The species were introduced by vessels.

I have not observed or seen the maritime mammals. There have been observed :

1. *Monachus tropicalis* ; caged near Havana, was stuffed, and afterward purchased by Mr. Poey for the Smithsonian Institution.

2. *Manatus* — Manati ; lives in different localities.

3. *Delphinus* ? — Tomina ; not rare ; seen from vessels.

4. *Phocæna* ? *Orcas*. Found dead on the seashore ; the skeleton was prepared for the Museum of the Academy.

The Salamanders Found in the Vicinity of New York City, with Notes upon Extra-Limital or Allied Species.

BY WILLIAM L. SHERWOOD.

This list embraces all forms of Salamanders hitherto found in this vicinity, and mentions others either on account of relationship or for comparison.

Much of the following is now in print, but scattered through various books, pamphlets or privately printed papers. I have endeavored to collate such information, and have added thereto my personal observations, commenting upon the varying opinions. I have freely consulted Professor Cope's *Batrachia of North America*, Nicholson's *Manual of Zoölogy* and W. H. Smith's *Urodela and Cæcilia*, and am indebted to Professor Simon H. Gage and others for valuable suggestions. Wherever statements or descriptions have been taken from other authors I have endeavored to give full credit.

Salamanders, on account of their secretive habits and, to many, repulsiveness of form, have been little studied, most of the work in this direction having been performed by the professional naturalist. To most people any reptile or batrachian is offensive, and is seen only to be destroyed, although, of late years, the many published articles upon the common toad and its value as an insect-destroyer have tended to bring about kinder feelings. The draining of lands and cutting of forests, as well as the increase of human habitation, have driven these animals further and further away, and many of the land forms can now be found

only where the "second growth" of forest has been allowed to come up undisturbed by annual fires.

Some attempt to catalogue the Salamanders of the State was made by De Kay in 1842 and published in the Natural History of New York, and an incomplete, and in some cases incorrect, list occurs in the Final Report of the Geologist of New Jersey, published in 1890. Particular instances of erroneous statements will be found under my descriptions of *Amblystoma punctatum* and *Plethodon cinereus*.

It is probable that all of the species occurring near New York have been described, but the finding of an isolated specimen once in two or three years would lead one to think that perhaps there are undiscovered forms so rarely seen as to have escaped the eye of a naturalist. Mr. Eugene Smith, of Hoboken, N. J., reports finding a specimen of *Desmognathus ocrophea* near Greenwood Lake, although no reference is made to its occurrence in New York south of the Adirondacks, or possibly near the northern counties of Pennsylvania. The New Jersey Geological Survey states that it should be found in the northern counties, but does not mention specimens from this locality as existing in the State Museum. It may be expected that certain supposed extra-limital forms still remain to be discovered. For example, the Cricket-Frog (*Acris gryllus*) described as more usually found "in the southern third of the State" of New Jersey,* is abundant along the Saddle River valley as far north as Hohokus, and is sparingly found in the low-lying lands to the east.

Although many insects are devoured by adult Salamanders, the situations in which the latter live are generally so far removed from farms as to render them of little use to agriculturists.

Any study of their habits or peculiarities must then be of value to naturalists only, as an aid in establishing laws of distribution or variation, thus directly bearing upon the

* Geol. Survey, 1890.

origin of species and evolution, and the discovery of the smallest change in animal development may indirectly add to the mass of petty details which make up the fund of knowledge needed in discussion of the more weighty philosophical questions. In the case of Salamanders this question may become particularly interesting as leading to further knowledge upon the adaptation of animals to environment. All those found here breed in water or in moist places, and at some time or other become strictly terrestrial, only one species (*Diemyctylus viridescens*) returning to a more or less aquatic life. If it can be demonstrated beyond question that this particular species was once strictly a land or water animal, and that, in the struggle for existence, it has been obliged to spend part of its life in a foreign element, and gradually acquired the habit, light would be thrown upon the vexed question of the possibility of such fixation or permanency as is involved in a species. It is already known (*vide* Darwin's *Origin of Species*, p. 397, *et seq.*) that the Black Salamander of the Alps (*Salamandra atra*) brings forth its young alive and fully formed, the metamorphosis having taken place in dilations of the oviducts of the mother. If taken from her, the young are found to have exquisitely feathered gills. Some were removed by Miss Von Chauvin and placed in water, where they swam about like ordinary tadpoles. They underwent the metamorphosis common to other Salamanders, and left the water fourteen weeks later as fully adult as those born from the mother.

The Urodela, or Salamanders, share with the other amphibians (Anura and Cæcilia*) a more or less complete metamorphosis, with branchial respiration in the young and partial or complete aerial respiration in the adults, and in the elimination of carbon dioxide by the skin. As in birds, reptiles, and fishes, the blood corpuscles are oval and nucle-

* Professor Cope places the Cæcilians with the Urodela as a family connected through the Amphiumideæ.—*Bull. No. 34, U. S. Natl. Museum*, p. 34.

ated.* The blood is cold, the circulation incomplete and practically suspended during hibernation. There are no external scales or scutes (*Amphiuma* and *Cæcilia* excepted), the skin being smooth and naked. This characteristic will enable the veriest novice to distinguish these animals from all lizards.

The fœtus is without the embryonic sac known as the amnion, and the allantois (organ by which fœtal blood is aerated) is absent, but represented by the urinary bladder. The skeleton is internal, the vertebræ biconcave (amphicœlous), or concave behind and convex in front (opisthocœlous). No Salamander has vertebræ which are concave in front only (procœlous), as in frogs. In the development the vertebræ are at first amphicœlous, as in fishes, an ossification of the intervertebral cartilage attaching itself later on to form those vertebræ which are opisthocœlous. The skull is connected by two occipital condyles, and the nasal sacs open posteriorly into the pharynx. The reproductive, urinary, and digestive organs open into a common receptacle, the cloaca.

The Sirens have fore feet only. All other tailed amphibians have four limbs, in which the radius and ulna, and tibia and fibula, are not anchylosed as in frogs. The Sirens of our Southern States and the Mud Puppies, or Water-dogs, of Western Rivers, with the *Proteus* of Austria, are the only forms which are perennibranchiate, the Siredons, or Axolotls being now accepted as more or less persistent larval forms of *Amblystoma*.

The Congo Snakes of the South and Hellbenders, or Mud-devils, of Ohio, retain branchial apertures in the neck of the adult. All other Salamanders of the United States are caducous, the gill slits being perfectly closed in adult.

The family divisions are based principally upon the arrangement of the teeth and the generic upon the shape of

* Professor John Michels has recently demonstrated the existence of both a nucleus and a nucleolus in mammalian red blood corpuscles.—*Sci. Am. Supp.*, May 4, 1895, p. 16, 126.

tail, attachment of the tongue, and development of the toes. Specific differences will be found under their respective headings.

The larvæ have external gills arranged in three tufts on each side, with a long process in front of first gill, known as the "balancer." The gills are upon the arches and adapted for breathing air dissolved in water. There are no internal gills, as in *Anura*. The larval heart consists of one auricle and one ventricle, as in fishes, and is respiratory in character, driving venous blood to the gills. In the adult, true lungs are always present, and the heart has two auricles and one ventricle.

In development, the anterior limbs appear first and the posterior follow.*

CLASSIFICATION AND LIST OF OUR LOCAL SPECIES.

The local fauna are embraced in the following classification :

Class, BATRACHIA.

Order, URODELA.

Families : {
 I. *Amblystomidæ*.
 II. *Plethodontidæ*.
 III. *Desmognathidæ*.
 IV. *Pleurodelidæ*.

Genera and Species.

Family I. {
 Vertebræ { *Amblystoma punctatum*.
 amphicæalous. { *Amblystoma opacum*.
 { *Amblystoma tigrinum*.

* The development of the anterior limbs of frog tadpoles is the same, but they are concealed by the operculum until after the appearance of the hinder limbs. This difference in the growth of the hood forms a distinguishing character by which the novice may determine the order to which a tadpole belongs.

| | | |
|--|---|---|
| Family II. Vertebræ amphicæulous. | { | <i>Hemidactylium scutatum.</i> |
| | | <i>Spelerpes ruber ruber.</i> |
| | | <i>Spelerpes bilineatus.</i> |
| | | <i>Plethodon cinereus erythronotus.</i> |
| | | <i>Plethodon cinereus cinereus.</i> |
| | | <i>Plethodon glutinosus.</i> |
| Family III. Vertebræ opisthocæulous. | { | <i>Desmognathus ocyphœa.</i> |
| | | <i>Desmognathus fusca fusca.</i> |
| Family IV. Vertebræ opisthocæulous. | { | <i>Diemyctylus viridescens viridescens.</i> |
| | | (Seasonal form) <i>D. miniatus.</i> |

Amblystoma punctatum Linnæus.

SPOTTED SALAMANDER.

This is the *Salamandra subviolacea* of DeKay, or Large-spotted Salamander. It is erroneously described in the New Jersey Geological Survey as "the Crimson-spotted Triton . . . so frequently seen in aquaria," the latter name belonging to *Diemyctylus viridescens*, which see.

Body thick and swollen; head broad and flat. Length 6 inches, of which the tail is a little less than half. Color black to purplish above, with a series of round yellow spots on each side of back and tail, and two or three on upper surface of each limb. Under surface dark blue, with inconspicuous white dots. Dorsal groove and eleven costal grooves, the latter strongly marked. In alcohol, dark brown, and the spots white or bluish.

Sparingly found at Fort Lee during the warm season under logs and stones in clearings; during the breeding season, and in October before the time for hibernation, they seem to have disappeared from the open, and are found in the swampy hollow far into the woods and not far from water, where their eggs may be found in large masses as early as April. Not as common as *A. opacum*.

Amblystoma opacum Gravenhorst.

BLOTCHED or MARBLED SALAMANDER.

This is the *Salamandra fasciata* (Green) of De Kay.

The head is not so broad as in *A. punctatum*. Length $3\frac{1}{2}$ to 4 inches, of which the tail is little over one-third.* Black, with ashy gray or bluish bands on the head and dorsal surface of body. These make the general color appear as blotches of black surrounded by gray, the latter color more or less as transverse bands which are more linear on tail. Ventral surface dark blue with white streak at gular fold. Costal grooves, 11.

The gray bands are sometimes confluent with those before or behind, and sometimes continue along the sides of the dorsal surface, abruptly ending without connection with the next. They are well confined to the dorsal region, and in young adults cover nearly the entire top of the head.

All examined by me are without a dorsal furrow, but it is stated by Mr. W. H. Smith, that he received eight specimens from Southern Illinois, all with this furrow very distinct. Half-grown specimens have white dots on the sides and below, which seem to disappear in the adult.

In the Ninth Annual Report of Smithsonian Institution, 1854, they are described by Rev. C. H. Mann as having eggs which are incubated in nests by the male or female.

It is believed that *A. opacum* lays its eggs in water. I have not raised them from the egg but have captured 70 larvæ at one time as early as April 17. These were found in shallow ponds in the open lots between woods at Fort Lee and were then from $\frac{1}{2}$ to $1\frac{1}{4}$ inches long. Most were captured by dragging a net through a thick submerged growth of rush-grass, *Eleocharis tenuis* (*paniciflora*?) Development is rapid, as by May 8 those taken had attained twice their length at time of capture, and those in ponds had almost entirely disappeared, probably having taken to

*Jordan's Manual and N. J. Geol. Survey give the tail as $2\frac{1}{2}$ inches. The longest specimen described measured 3.80 inches with tail only $1\frac{1}{2}$ inches.

land. I have found larvæ as late as June 4, quite fully developed. The young are thickly spotted with white, and the bands do not show as characteristic markings before the animal has reached about two inches in length.

The adults seem to favor quite dry situations, as I have taken them from under stones lying in a sandy and gravelly path upon the top of a hill. They frequently burrow under stones which enter deeply into soil. I have captured them as late as October 25, and think that they hibernate very late in the fall.

Amblystoma tigrinum *Green.*

TIGER TRITON.

Triton tigrinus Holbrook ; De Kay.

Amblystoma mavortium.

Larval form : *Siredon lichenoides.*

Siredon gracilis.

This is the largest eastern Salamander, a specimen eleven inches in length being described by De Kay. It should occur at Fort Lee, and Col. Nicolas Pike tells me that he once captured one there. All specimens received by me were from a pond near Rancocas, L. I

Body large and thick. Head more narrow, swollen on sides. Gular fold overlapping. Tail flatly compressed towards tip and as long as head and body. Legs short and very stout, with short triangular digits in aquatic specimens. Body black or brown, with oblong and quadrate blotches on the back and parallel quadrate blotches along the costal grooves, some extending across the ventral surface, covering the ground color. In the specimen described (length, nine inches) the entire under surface of the head is yellow, and only one longitudinal blotch appears before reaching the third costal groove. Tail lighter brown, with few black blotches. Under surface with a central line of black more or less interrupted by alternate or opposite ends of yellow costal bands ; the

under surface of the tail, from anus to within half inch of tip, forms an irregular but continuous blotch of black. Limbs somewhat banded; predominant color, yellow.

This species is partially aquatic, leaving the water late in the season to occupy burrows in the soil. Those which I have kept in a terrarium have concealed themselves during the day, only the snout showing at the surface, but I have frequently found them out at night, during which time they greedily devoured small frogs.

It has been demonstrated that the Axolotls of the Western Lakes, *Siredon lichenoides* and *S. gracilis*, are both forms of *A. mavortium*,* the western variety of *A. tigrinum*. Prof. Cope thinks that ultimately *A. mavortium* will have to be viewed as a developmental form of *A. tigrinum*.† The Siredons breed as larvæ and are not known to complete the metamorphosis in a state of nature. Those bred to *Amblystoma* were sterile. Numerous articles have appeared in regard to this remarkable and unusual transformation, some writers claiming that the Axolotls (including *S. mexicanus*) have *remained* upon a lower phyletic stage of development. Prof. Weismann‡ claims that a sudden leap from a lower form to one much higher would carry with it higher powers, and says that the sterility of the animals so developed shows the probability of former reversion from an *Amblystoma* stage to a larval condition where reproduction takes place. The return to the older adult form would then occur after the reproductive period, thus explaining why reproductive powers did not follow the usual morphological change.

* Cope's *Batrachia*, p. 453.

† *Ibid*, p. 73.

‡ Smithsonian Report, 1877, pp. 349-375. See also Observations on the Metamorphosis of *Siredon* into *Amblystoma*, O. C. Marsh, *Am. Jour. of Sci. and Arts*, Nov., 1868.

Hemidactylium scutatum *Tschudi*.

FOUR-TOED SALAMANDER.

Chestnut-brown above ; muzzle lighter. White below, with spots as though spattered with ink. Length $2\frac{1}{2}$ to 3 inches. Body slender and tail half as long. Limbs weak and small, with four toes only. Snout as though cut off (truncate). Curiously sculptured furrows proceed backward from the dorsal line and others appear on the sides. Terrestrial ; never aquatic.

Not frequent, but abundant where found. I captured five in one afternoon at Fort Lee, in open woods where grass was growing. All were under stones and curled. Single specimens taken at Harrington, N. J., from under boards or logs, about five feet from a pond. Time of captures, May and June.

Spelerpes ruber *Daudin*.

RED SALAMANDER.

This is the *Salamandra rubra* of De Kay.

Adults dark salmon to bright red. Dorsal surface thickly covered with black spots ; color between these brownish red. Young adults yellowish ; almost white, with fewer spots. Under surface immaculate in young except the extreme edge of the snout, which is blackish. Old specimens with black dots sparsely scattered along abdomen, more thickly towards head. Old, stout ; young, more slender. Head flat, triangular. Slight fold at neck.

Larvæ, at $2\frac{1}{4}$ inches, with a dorsal fin the whole length and a ventral fin on posterior half of tail. Whole dorsal region and sides covered with a reticular pattern of brown about to break up into spots.

This is the largest species of its genus in America : Length 5 to $5\frac{1}{2}$ inches ; diameter of body nearly half an inch. Costal folds, 15-16.

I captured several adults at Hemlock Falls, Orange

Mountains, under turfy soil overflowed by a brook, and some under stones in a brook. All during May and June. I have heard of their being turned up by the plow, and assume that later in the season they become more terrestrial. They are sometimes found in cold springs, and the larvæ are generally in the deeper pools of permanent brooks.

***Spelerpes bilineatus* Green.**

STRIPED-BACKED SALAMANDER.

This is the *Salamandra bilineata* of De Kay.

Yellow to brownish yellow, with a ragged dark line along each side of and well confined to the dorsal region, and dots sprinkled longitudinally along the band between the lines, mostly central and generally extending a little on the upper surface of tail. Sides below the lateral lines obscurely dusky brown, much more so on the tail, this color extending to its tip. Ventral surface unspotted, bright yellow, and the intestines visible through the skin. Length, three inches; slender. Costal folds, 14.

Very common under flat stones in or near shallow brooks. Runs swiftly. Eggs found October 25.

***Plethodon cinereus erythronotus* Green.**

RED-BACKED SALAMANDER.

This is the *Salamandra erythronota* of De Kay. Lead color above, generally with a dorsal band varying from dark red to faint. Sides speckled, ashy. Ventral surface marbled except at throat and chin, which are much lighter; also much lighter on under surface of limbs and between hinder ones. Tail very long, conical, slightly compressed towards tip. Length, three to four inches. Limbs slender. Costal folds, 16-19.

***Plethodon cinereus cinereus* Green.**

GRAY SALAMANDER.

Same color on sides and under surface as *P. cinereus*

erythronotus, but without red dorsal band. Both readily distinguished from *Spelerpes bilineatus*, the only local Salamander resembling them in form, by comparison of ventral surface, which in the latter is immaculate.

The eggs are laid in damp moss and under bark of decayed trees. Found October 25. The young lose their gills about three or four days after hatching. It is never aquatic, even in the larval stage.*

Very common in woods under logs and stones. Several captured as early as April 17, six under one stone.

Prof. Cope says he can find no differences in structure, proportions or general character between *P. cinereus* and *P. erythronotus*, but believes the varieties to be very permanent. On May 14 I found seven pairs, each pair under a separate stone, and, in each instance, one with red back and one with brown. As males and females of both kinds are found, this has no present significance, but is mentioned for comparison.

***Plethodon glutinosus* Green.**

BLUE-SPOTTED SALAMANDER.

This is the *Salamandra glutinosa* of De Kay.

Whole skin covered with a milky secretion or mucus. Glossy black with white spots thickly scattered, some forming confluent blotches on the sides; generally a large number at sides of neck, and one to several on throat; also spots on the legs. Gular fold distinct; in alcohol shows as a white band. Color below bluish to lead color. Body stout. Fore legs slender; hinder comparatively stout. Length four to six inches, of which tail is about two or more. Costal folds, 14.

Found at Fort Lee, generally between rocks or ledges in the woods, and under logs near by. Always terrestrial.†

*Erroneously described in N. J. Geol. Survey as "found about rapid streams where there are flat stones under which it can conceal itself when pursued."

†Erroneously described in N. J. Geol. Survey as "generally met with on the bottoms of brooks."

During one very warm afternoon I captured over 70 by splitting away schistose rock and breaking up shale at the sides of a shaded road running down the southern slope of the Orange Mountains.†

***Desmognathus ocropheæ* Cope.**

YELLOW SALAMANDER.

Professor Cope says: "This small species bears a strong resemblance to *Spelerpes bilineatus*, and, apart from generic characters, may be known from it by the rounded tail, the paler-colored abdomen, and the light bar from the eye to the angle of the mouth."

Yellowish, with dark brown band above, and dots along vertebral line. Dirty white below. Length, three inches, of which the tail forms $1\frac{1}{2}$ inches. Costal folds, 13-14.

Described by authors as occurring in the Alleghany region and in the Adirondacks. The New Jersey Geol. Survey Report says: "Should occur in our northern counties." I have heard of only one specimen near here, found at Greenwood Lake by Mr. Eugene Smith, of Hoboken, N. J.

***Desmognathus fusca* Rafinesque.**

DUSKY SALAMANDER.

Described by DeKay as *Salamandra picta*.

Brown to blackish above, varying from brown, in young and decidedly aquatic specimens, to blackish in old and those which live under stones near water. Pinkish spots and whitish dots in some. Marbled below except central portion of ventral surface, which is still less so in brown specimens. Head very flat. Eyes prominent. Dorsal furrow. Tail flat and keeled. Costal folds, 14. Length, $4\frac{1}{2}$ inches, of which the tail forms one-half.

†I regret to say that I cannot now find my note book, but remember that the date was during the latter part of July. Prof. Cope says (*Batrachia* of North America, p. 142) that he believes that it prefers a cool climate, and adds: "I have only found it on the northern exposure of the south Chester Valley hill, never on the southern exposure or other part of the north hill."

Most abundant of all our Salamanders. Common in all shallow brooks where the young may be seen as small brown newts; the latter also occur in cold springs and have been taken from shallow wells.

I have never found it at a distance from water. Aquatic as they may seem, the adults will not live in an aquarium as free swimmers, soon drowning if not provided with external resting places.

The eggs are stated by Baird and Cope to be connected by an albuminous thread, and to be protected by being wrapped several times around the body of one of the sexes, which remains concealed in a comparatively dry spot.* I have twice found eggs within three or four days of hatching, in each instance accompanied by an adult Salamander, but in a mass along side. It is probable, therefore, that at a certain period the albuminous thread is broken, and the eggs are gathered into a mass by the watchful parent. The masses are too compact to have been formed by slipping from the body of the adult.

I think there are two broods annually, as I have found eggs from July to October, and have seen very small larvæ as late as November 30.

A few dates of capture are as follows :

Feby. 22.—Under stones and leaves which were in a small trickling brook caused by melting snow, I found several large specimens which were lively and difficult of capture. In a spring near by were larvæ $\frac{3}{4}$ to $1\frac{1}{2}$ inches long. Under stones near this spring were over forty adults; these were comparatively sluggish and evidently in hibernation.

Oct. 25.—In following a dry bed of a brook I found adults, together with leeches and aquatic beetles, under such stones as rested deeply enough to keep the under surface damp or muddy.

* Cope's *Batrachia*, p. 197.

Diemyctylus viridescens Rafinesque.Seasonal form, *D. viridescens miniatus*.SPOTTED TRITON ; YELLOW-BELLIED LIZARD ; RED
EFT OR EVET ; WATER NEWT.This is the *Salamandra symmetrica* of De Kay.

Red to dark olive-green above, with bright red spots on sides, each surrounded by a black ring. Below yellow with black dots, which appear also on sides and somewhat as a row or rows on tail.

Late in autumn the males acquire a series of horny ridges along the inner surface of the hind legs, and the tail fin becomes fully developed. These characteristics remain until after the breeding season in spring. Frequently, mating takes place in autumn. This was first seen by me in 1890, and its annual recurrence confirms Prof. Gage's observations. (*Vide infra*.) He states that no eggs are found in the oviducts in autumn, but that the female may store zoösperms until the time of ovulation.

The adult Salamander is frequent in ponds, ditches, and stagnant water in bogs, but has not been found in running streams except as connected with ponds. The red terrestrial form has not been found by me near New York.

The life-history of *Diemyctylus viridescens* has been well worked out by Prof. Simon H. Gage of Cornell University,* and only such facts will be noted here as are necessary to aid those who cannot readily refer to the article, or as will have bearing upon mooted questions.

This Salamander, according to the observations of Professors Gage and Cope, lays its eggs singly in the leaves of plants, or on stones. The larvæ are more or less of the viridescent color of the adult and, where *miniatus* is found, most of them lose their gills and leave the water at the end of the first season, to gradually assume the terres-

* American Naturalist, December, 1891, pp. 1084-1110; Plate and bibliography.

trial form with its distinctive red coloration. This stage is believed to continue "until the autumn of the third or spring of the fourth year after hatching," * when they assume the adult form with its viridescent coloration, generally entering the water. The change may take place on land, as I have frequently captured the adult at some distance from water, and probably occurs at a given period regardless of situation.

From the fact that during five years I have overturned hundreds of logs and stones in the woods in the vicinity of New York, and searched after a rain, and have found only one specimen of *D. viridescens* approaching in color to the *miniatus* form, and from observations by others and inquiries as to the occurrence of the latter anywhere near the coast, I am led to believe that in this locality, at least, the transformation does not take place, but that the whole period of the growth is aquatic. Specimens of all sizes have been captured in the water, many of them quite red and apparently half-grown. In Sullivan County and in Southern Vermont, where there is apparently about the same frequency of aquatic specimens, hundreds of the red ones may be found in the woods under leaves or moss, sometimes sunning themselves upon the upper surface of a fallen log, and almost everywhere after a rain. The occurrence of hundreds of the adults in one pond near Mount Vernon, without finding a single specimen of the *miniatus* form during many years, must lead to the above opinion or to the future discovery of their passing their terrestrial life in situations entirely different from those now observed.

Colonel Nicolas Pike and Professor Verrill speak of their eggs as occurring in masses, the former stating that he reared the young until about four months old. From his description of their markings I am led to believe that they were the larvæ of one of the Amblystomas, although both methods of laying eggs might exist, one as the habit of prolific females, the other suggesting modification of habit

* *Ibid.*

through environment, or approach to sterility in some females. As I have taken specimens over $2\frac{1}{4}$ inches in length, with stout bodies, and retaining gills, and from same ponds procured adults of much smaller size, it would seem that the habits of development and periods of growth are widely different. Any examination of the peculiarities of this animal must consider the absence of the *miniatus* form near tide water and the finding of adults on dry land, although able to live in water.

Prof. Gage says he has never seen the cast-off skin rolled up and swallowed by the aquatic form. I have seen them seize small pieces of the exuvium partly detached from the hind legs and swallow it.

Up to 1891 no observation is known to have been made of the duplication of the tail above and below the axis of the body. During that summer I discovered two such specimens of tadpoles of *Rana catesbiana* which were described and illustrated in the American Naturalist of August, 1891. At present I have an adult *D. viridescens* in which a similar duplication exists. The body is fully developed, being over three-fourths of an inch in diameter and over two inches in length. The tail is thick and short,—about an inch long,—with continuous fin-fold, but prominent vertical duplication of muscle plates and apparently of chordæ, although dissection would be necessary to prove the existence of the latter. As the specimens already mentioned were larval and were preserved as such, it is probable that such duplication has not hitherto been observed in an adult.

Since writing above, I have received a larval *Diemyctylus* of such unusual size that I have thought it well to describe it.

Color above, uniformly brown. Yellow beneath, with brighter ventral line. *No ocellated spots*. Entire upper and under surface thickly punctate with black dots. Sharply keeled from occiput to end of tail. Length $3\frac{1}{4}$ inches; stout.

Branchiæ extenal, fully fimbriated, with no indication of atrophy. The animal shows signs of distress if removed from water.

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1895-96.

No. 8.

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OF

NEW YORK.

For the Year Ending March 24, 1896,

WITH

THE SNAKES FOUND WITHIN FIFTY
MILES OF NEW YORK CITY,

BY R. L. DITMARS.

*The Society meets on the second and fourth Tuesday
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TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPIECE—PORTRAIT OF LINNÆUS.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTHEAST-ERN NEW YORK. By CLINTON HART MERRIAM, M.D.

General Introduction. Mammalia: Carnivora. Biographies of the Panther, Canada Lynx, Wild Cat, Wolf, Fox, Fisher, Marten, Least Weasel, Ermine, Mink, Skunk, Otter, Raccoon, Black Bear, and Harbor Seal.

IS NOT THE FISH CROW (*Corvus ossifragus* Wilson) A WINTER AS WELL AS A SUMMER RESIDENT AT THE NORTHERN LIMIT OF ITS RANGE? By WILLIAM DUTCHER.

A REVIEW OF THE SUMMER BIRDS OF A PART OF THE CATSKILL MOUNTAINS, WITH PREFATORY REMARKS ON THE FAUNAL AND FLORAL FEATURES OF THE REGION.

By EUGENE PINTARD BICKNELL.

New York, December, 1882.

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THE VERTEBRATES OF THE ADIRONDACK REGION, NORTHEAST-ERN NEW YORK. (MAMMALIA CONCLUDED.)

By CLINTON HART MERRIAM, M.D.

Contains Biographies of the Deer, Moose, and Elk; of the Moles and Shrews (six species); the Bats (five species); the Squirrels (six species); the Woodchuck, the Beaver, the Porcupine, the House and Field Rats and Mice (seven species), and the Hares (three species).

DESCRIPTION OF A NEW GENUS AND SPECIES OF THE SORECIDÆ. (*Atophyrax Bendirii*, with a plate.)

By CLINTON HART MERRIAM, M.D.

New York, August, 1884.

Price: Paper, - \$2.00. Cloth, - \$3.00.

ABSTRACT OF PROCEEDINGS.

ABSTRACT OF PROCEEDINGS OF THE LINNÆAN SOCIETY OF NEW YORK.

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ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK,
FOR THE YEAR ENDING MARCH 24, 1896.

This is the eighth in the series of "Abstracts" published by the Society, and, like the preceding numbers, is intended mainly as a brief review of the year's work, only the more important points in the papers read before the Society being mentioned. Some of the papers have been printed in full elsewhere, and in such cases a reference is given to the place of publication.

April 9, 1895.—Mr. Frank E. Johnson in the chair. Eight members and three visitors present.

Fifteen dollars were contributed by the Society to the fund being raised by Mr. William Dutcher, for the protection of the Terns on Great Gull Island, Suffolk County, New York, during the breeding season of 1895, under conditions similar to those of the previous year.

Mr. L. S. Foster read a letter from L. B. Bishop, M. D., recording his capture of a hybrid Sandpiper (*Tringa maculata* + *Tringa fuscicollis*) on the Quinipiack Marshes, North Haven, Connecticut, on August 4, 1894.

Mr. L. S. Foster presented a paper entitled "Remarks

on the Petrels, with an Account of the Specimen of *Æstrelata hasitata* taken in Ulster County, New York, on January 26, 1895." [See "Auk," Vol. XII., 1895, p. 179.]

Mr. E. I. Haines recorded the occurrence of the Myrtle Warbler (*Dendroica coronata*) at Scarsdale, New York, on March 23, 1895, and of the Ruby-crowned Kinglet (*Regulus calendula*) at New Rochelle, New York, on March 24, 1895. He also spoke of the extension of the range of the Starling (*Sturnus vulgaris*) in this country. [See "Forest and Stream," April 6, 1895.]

Mr. S. H. Chubb noted the presence of the American Crossbill (*Loxia curvirostra minor*) in Central Park, New York City, on April 1, 1895.

April 23, 1895.—The Vice-President in the chair. Ten members and six visitors present.

Mr. William L. Sherwood presented "Further Remarks on the Salamanders Found in the Vicinity of New York City."

May 14, 1895.—The Vice-President in the chair. Seven members and one visitor present.

The Auditing Committee reported that it had examined the Treasurer's report and found it correct.

Mr. F. M. Chapman made a series of remarks on "The Wing as a Musical Instrument," illustrated by specimens of birds which he considered to use their wings to supplement, or in place of their voice. Among these were *Trochilus colubris*, *Ostinops decumanus*, *Rupicola sanguinolenta*, *Manacus manacus*, *Machæropterus deliciosus*, *Todus multicolor*, and *Phænicopterus carnifex*.

Mr. Louis Gillet read a list of nineteen species of birds observed by him in Central Park, New York City, this spring, giving the date of arrival of each. He also stated that a flock of American Crossbills (*Loxia curvirostra minor*) appeared in Central Park in January and remained until May 4, 1895.

Mr. L. S. Foster read a letter from Mr. Samuel H. West, recording the capture, by Mr. George W. West, of two

specimens of Brünnich's Murre (*Uria lomvia*) at Mott's Point, Long Island, New York, on December 11, 1894.

May 28, 1895.—The Vice-President in the chair. Ten members and five visitors present.

Mr. L. S. Foster submitted a proposition for raising twelve hundred dollars from among the members and purchasing the William Dutcher collection of two thousand birdskins, the same to be presented to The American Museum of Natural History as the Society's contribution to its growth. The plan was approved and adopted.

Mr. Stephen A. Krom presented a paper on "The Archæopteryx," with especial reference to the two known remains from the Solenhofen beds in Bavaria.

Mr. S. H. Chubb and Mr. F. M. Chapman spoke of the large number of species and individuals of birds seen by them in Central Park, New York City, during the early morning hours of May 24, 1895. Both had found the Canadian Warbler (*Sylvania canadensis*) very numerous.

Mr. L. S. Foster observed the Carolina Wren (*Thryothorus ludovicianus*) at Van Cortlandt Park, New York, on May 4, 1895, and Mr. Chubb had also seen this species at the same place on April 12.

October 8, 1895.—The Vice-President in the chair. Nine members and three visitors present.

Mr. L. S. Foster presented a paper on "Some Unconfirmed Records of Birds in the Vicinity of New York City." This paper recounted the unconfirmed records of thirty species of birds within the area designated, and was discussed, record by record, by those present. Only two of these species, the Iceland Gull (*Larus leucopterus*) and the Varied Thrush (*Hesperocichla nœvia*), were admitted to our local list. [See "Auk," Vol. XII., 1895, p. 76, and Coues' "Birds of the Colorado Valley," 1878, p. 19.]

Mr. E. I. Haines reported the following records made by himself: Chestnut-sided Warbler (*Dendroica pensylvanica*), male and female, and nest with four young birds, at New Rochelle, New York, on June 18, 1895, and a Blue-

gray Gnatcatcher (*Polioptila cærulea*) at the same place, on September 12, 1895.

Mr. Stephen A. Krom said that he had found the Turkey Vulture (*Cathartes aura*) very common at Lebanon, Hunterdon County, New Jersey, during the past summer, where it occurs regularly.

L. B. Bishop, M. D., exhibited the skin of a Shrike, a bird of the year, taken at New Haven, Connecticut, on September 18, 1895, in a plumage between *Lanius ludovicianus* and *Lanius ludovicianus excubitorides*. Dr. Bishop gave several autumn records of birds observed, notably one of a Buff-breasted Sandpiper (*Tryngites subruficollis*) taken on the marshes near New Haven, Connecticut, on September 30, 1895, by Mr. C. C. Trowbridge.

Mr. L. S. Foster read a letter from Mr. John H. Sage, recording the capture by him of a typical Lawrence's Warbler (*Helminthophila lawrencei*) at Portland, Connecticut, on May 10, 1895, and of a male Brewster's Warbler (*Helminthophila leucobronchialis*), at the same place, on May 13, 1895. Five specimens of the latter Warbler were seen in Portland during the month of May, 1895, and a pair of Worm-eating Warblers (*Helminthus vermivorus*) spent the summer of 1895 there. A specimen of the King Rail (*Rallus elegans*) was shot on September 1, 1895, this being the fourth local record. A flock of seventy-five White-winged Scoters (*Oidemia deglandi*) were seen on October 4, 1895, on the Connecticut River at Portland, and thoroughly identified.

Mr. L. S. Foster read a list of thirty-five birds observed by him in Westchester County, New York, on May 30, 1895.

October 22, 1895.—The President in the chair. Seven members and three visitors present.

J. A. Allen, Ph. D., presented the paper of the evening, "On the Mammals of Southwestern Texas, from Field Notes and Specimens Collected by Mr. H. P. Attwater." [See Bull. Am. Mus. Nat. Hist., Vol. VIII., 1896, pp. 45-80.]

Mr. L. M. Loomis said that the Guadalupe Caracara (*Polyborus lutosus*) had been, it is believed, entirely exterminated by the goat-herds of Guadalupe Island, Lower California.

November 26, 1895—The Vice-President in the chair. Twelve members and twelve visitors present.

Mr. F. M. Chapman presented "Remarks on Birds Collected in Greenland by the Peary Expedition," illustrated by specimens.

December 10, 1895.—The Vice-President in the chair. Fifteen members and thirteen visitors present.

L. B. Bishop, M. D., presented a paper entitled "A Day in North Dakota," giving a graphic account of his own experience while collecting in the vicinity of the Turtle Mountains. This is a rich field, ornithologically speaking, and little has been published concerning it.

Mr. H. W. Congdon read a paper on "Some Birds Observed between Scotland and Iceland during August, 1895," in which he depicted many features of the pelagic life of the species treated.

Mr. Henry Hales, in a series of remarks on "Tameness and Domestication," described the habits of many of our domestic animals and compared them with those of the wild species. This paper elicited an animated discussion on the subject.

December 24, 1895.—The Vice-President in the chair. Seven members and twelve visitors present

The Lecture Committee presented a report through Mr. F. M. Chapman, stating that arrangements had been completed for a course of three lectures to be given in the lecture hall of the American Museum, as follows:

1. January 14, 1896. "The Indians of Vancouver Island," by Franz Boas, Ph. D.

2. January 28, 1896. "The Origin and Distribution of North American Mammals," by W. B. Scott, Ph. D.

3. March 3, 1896. "Two Months in Greenland," by William Libbey, Sc. D.

Mr. R. L. Ditmars presented a paper on "The Snakes Found within Fifty Miles of New York City," treating of all the species known to this locality and exhibiting specimens—some living and some alcoholic—of the species treated. [This paper is printed in full at the close of this Abstract.]

January 14, 1896.—Public lecture in the lecture hall of the American Museum of Natural History, by Franz Boas, Ph. D., entitled "The Indians of Vancouver Island," with stereopticon illustrations.

January 28, 1896.—Public lecture in the lecture hall of the American Museum of Natural History, by W. B. Scott, Ph. D., entitled "The Origin and Distribution of North American Mammals," with stereopticon illustrations.

February 11, 1896.—The Vice-President in the chair. Nine members and ten visitors present.

Mr. L. S. Foster, as chairman of the committee on the purchase and presentation to the American Museum of the William Dutcher collection, reported on behalf of himself and his colleagues, Mr. Woodbury G. Langdon and Mr. Newbold T. Lawrence, that the collection had been purchased and presented to the Museum on December 17, 1895. He also read a letter from the Board of Trustees, acknowledging the gift. This collection of two thousand and fifteen birdskins is to be kept separate from the regular study collection of the Museum, as a purely local one, and, it is anticipated, will be added to, from time to time, by the members of the Society.

Mr. William Dutcher presented skins of the following birds to be transferred to the Local Collection of the Museum:—Greater Snow Goose (*Chen hyperborea nivalis*), Ring-billed Gull (*Larus delawarensis*), Red-shouldered Hawk (*Buteo lineatus*), and Fox Sparrow (*Passerella iliaca*). Mr. Foster was appointed a committee of one to take charge of these transfers for the future.

Mr. A. H. Howell presented a paper entitled "Impressions of Some of the Birds of the Northwest, with Remarks on their Distribution," the result of a six months' expedition

through northwestern Montana, northern Idaho, and the eastern part of Washington and Oregon.

February 25, 1896.—Mr. L. S. Foster in the chair. Five members and five visitors present.

Mr. A. H. Howell read a paper entitled "Remarks on Mammals observed in Montana, Idaho, Washington, and Oregon during 1895."

Mr. L. S. Foster reported the capture by himself of a male Pine Grosbeak (*Pinicola enucleator*) near Sing Sing, New York, on February 12, 1896. [See "Auk," Vol. XIII., 1896, p. 175.]

March 3, 1896.—Public lecture in the lecture hall of the American Museum of Natural History, by William Libbey, Sc. D., entitled "Two Months in Greenland," with stereopticon illustrations.

March 24, 1896.—Annual Meeting. Dr. Jonathan Dwight, Jr., in the chair. Six members and two visitors present.

The Secretary presented his annual report, as follows :

"There have been held during the past year 12 meetings of the Society. The average attendance of members was 9 and of visitors 8. The largest attendance of members at any one meeting was 15 and of visitors 19. The total number of persons attending the meetings during the entire year was 208, as against 182 for the year previous.

"There are at present 147 Resident members, 37 Corresponding members, and 2 Honorary members,—a total of 186 and a decrease of 3 since the last annual meeting.

"The members lost by death during the year were John H. Ripley, M.D., and Juan Gundlach, Ph.D.

"There have been read before the Society 16 papers, of which 10 related to ornithology, 4 to herpetology, and 2 to mammalogy.

"The Society has issued 'Abstract of Proceedings, No. 7,' to which are appended 'Notes on Cuban Mammals,' by Dr. Juan Gundlach; 'Salamanders Found in the Vicinity of New York City, with Notes upon Extra-limital or Allied Species,' by Mr. William L. Sherwood; and an index,—

making a pamphlet of 41 pages. The usual distribution to members and the exchange list was made."

The Librarian presented his annual report, as follows :

" The library of the Society has been increased by about 300 pamphlets during the year, over 200 of these coming from the U. S. Department of Agriculture and the remainder from the regular exchanges. No work has been done towards further cataloguing the library."

The Treasurer presented his annual report, showing a balance on hand of \$239.34.

The following officers were elected for the ensuing year :
President, J. A. Allen, Ph. D.

Vice-President, Mr. Frank M. Chapman.

Secretary, Mr. Walter W. Granger.

Treasurer, Mr. L. S. Foster.

Mr. W. W. Granger presented extended remarks, illustrated by specimens, on "The Mammals of the Bitter Creek Desert, Wyoming."

Mr. L. S. Foster read a paper entitled "Remarks on Twenty Species of Birds Frequently Observed in New York City and Vicinity." This was the first formal presentation of the facts collected by the Committee on the Local Fauna and treated the following birds from a local standpoint: American Herring Gull (*Larus argentatus smithsonianus*), Flicker (*Colaptes auratus*), Chimney Swift (*Chætura pelagica*), Kingbird (*Tyrannus tyrannus*), Phœbe (*Sayornis phæbe*), Wood Pewee (*Contopus virens*), Blue Jay (*Cyanocitta cristata*), American Crow (*Corvus americanus*), Red-winged Blackbird (*Agelaius phæniceus*), Meadowlark (*Sturnella magna*), American Goldfinch (*Spinus tristis*), Chipping Sparrow (*Spizella socialis*), Song Sparrow (*Melospiza fasciata*), Barn Swallow (*Chelidon erythrogaster*), Catbird (*Galeoscoptes carolinensis*), Brown Thrasher (*Harporhynchus rufus*), Chickadee (*Parus atricapillus*), American Robin (*Merula migratoria*), Bluebird (*Sialia sialis*), and English Sparrow (*Passer domesticus*).

The Snakes Found within Fifty Miles of New York City.

BY R. L. DITMARS.

The object of the following paper is to enumerate the Snakes found in the vicinity of New York City, and to give, together with brief descriptions of the species, such notes on their local distribution and habits as may prove of value to those interested in the subject.

Species of doubtful occurrence have been omitted.

Family Colubridæ.*

Head above, with symmetrical plates. Maxillary and palatine bones with recurved teeth.

SYNOPSIS OF GENERA AND SPECIES.

Genus *Carphophiops*.

Head of same width as neck. No preocular; loral entering orbit; one nasal plate. Scales smooth.

Chestnut brown above, red beneath *C. amœnus*.

Genus *Lampropeltis*.

Head but slightly distinct from neck. One anteocular; two nasals; loral present. Scales smooth.

Light gray, with chestnut brown spots edged with black *L. doliatus triangulus*.

Genus *Diadophis*.

Head distinct. Generally two preoculars; one loral; two nasals. Scales smooth.

Dark gray above, with a yellow ring around neck; yellow beneath *D. punctatus*.

*All of our local species of *Colubridæ* have the plates under the tails (sub-caudals) divided; and the eye with a round pupil.

Genus **Liopeltis**.

Body slender. One nasal; one or two preoculars; loral present. Scales smooth.

Green above, excepting labials, which are yellow;
under side, pale yellow *L. vernalis*.

Genus **Opheodrys**.

Body very slender; tail long. One nasal; one ante-ocular; loral present. Scales carinated.

Green above, with the labials yellow; beneath, pale yellow *O. æstivus*.

Genus **Bascanion**.

Body moderately slender. Two nasals; two preoculars; loral present. Scales smooth.

Uniform black above and below, with the throat white *B. constrictor*.

Genus **Callopeltis**.

Body moderately stout. Two nasals; one preocular; loral present. Scales generally carinated.

Scales weakly carinated. Black above; beneath, anteriorly white blotched with gray becoming uniform slaty gray posteriorly *C. obsoletus*.

Genus **Heterodon**.

Body stout. Rostral upturned; oculars numerous; labials not entering orbit. Scales carinated.

Dark yellow or brown with darker transverse blotches *H. platyrhinus*.

Genus **Thamnophis**.

Anterior and posterior oculars present. Two nasals; one loral. Scales carinated. Anal plate entire.

One anterior and three posterior oculars. Brown or black above, with three yellow stripes. Lateral stripe on third and fourth rows of scales. Form very slender *T. saurita*.

Oculars one and three. Brown with three yellow stripes. Lateral stripe on second and third rows of scales. Form stout..... *T. sirtalis*.

Genus *Natrix*.

Anterior and posterior oculars present. Two nasals; one loral. Scales carinated. Anal plate divided.

One anterior and three posterior oculars. Brown with darker irregular transverse bands; beneath, white spotted with red.... *N. fasciata sipedon*.

Genus *Storeria*.

Size small. Two nasals. Loral absent. Scales carinated.

One preocular. Brown above, pinkish white beneath. *S. dekayi*.

Two preoculars. Brown above, bright red beneath. *S. occipitomaculata*.

Family *Crotalidæ*.*

Head with a deep pit between the eye and nostril. Upper jaw with two long erectile poison fangs.

SYNOPSIS OF GENERA AND SPECIES.

Genus *Agkistrodon*.

Head with nine plates above. Tail ending in a horny spine. Scales carinated. Urosteges entire.

Light brown with reddish-brown transverse blotches, which are widest laterally. Labials not entering orbit..... *A. contortrix*.

Genus *Crotalus*.

Head with small scales between the superciliaries and posteriorly. Tail ending in a rattle. Urosteges entire.

Light brown, with dark transverse dorsal bands. Tail black *C. horridus*.

*The two local species have the subcaudal scuta in one row. All the species of the family have an elliptical pupil; this at once makes it easy to distinguish the local *Colubridæ* from the venomous species, as the former have a round pupil and the subcaudal scuta bifid.

DESCRIPTIVE LIST.

ASINEA.

COLUBRIDÆ.

Carphophiops Gervais.

Head and neck of same width; snout sharp and protruding. One nasal plate, nostril in the middle. No preocular, loral plate entering orbit. Scales smooth. Anal scutum and subcaudals divided. Body subcylindrical; tail short.

Carphophiops amœnus (Say).

WORM SNAKE.

Upper labials five, increasing in size posteriorly. Vertical plate about as broad as long; superciliaries very small and narrow. One postocular of moderate size. Color above, light brown or brownish gray; beneath, salmon red. Length generally about ten and a half inches, of which the tail occupies one-seventh of the total measurement.

This little worm-like snake is found in rather damp localities, especially under decaying logs, where it burrows with the aid of its sharp snout. Captive specimens feed upon earth-worms which, together with the wood-eating larvæ of *Coleoptera* that abound in places frequented by the reptile, probably form a large percentage of its food. Although seemingly well distributed and tolerably common, specimens are not often seen, owing to their secretive habits and diminutive size.

Lampropeltis Fitz.

Head but slightly distinct from neck. Two nasals; one anteocular; loral present. Body moderately stout. Scales smooth. Anal plate entire; subcaudals bifid.

Two species are recorded from this vicinity, *L. getulus* and *L. doliatus triangulus*. The former is mentioned by DeKay* as occurring on Long Island, but rare in that

*Zoölogy of New York, Part III., 1842, p. 38.

locality; the latter species is not rare in many districts in this vicinity. In the last five years, having heard of no *L. getulus* from Long Island or this vicinity, further mention of the species has been omitted as not coming within the limit of the present paper.

Lampropeltis doliatus triangulus (*Boie*).

MILK SNAKE.

Head depressed, snout rather broad. Seven upper labials, anterior ones edged with black; a black band begins behind the eye and runs downward into seventh labial. Body above, yellowish gray with a dorsal series of irregular chestnut-brown spots edged with black, about fifty in number; on the side is a series of smaller spots in alternation with the dorsal row; beneath, white with numerous small oblong black spots. Length from three to five feet.

This beautiful species is generally distributed in this vicinity, but is not common. It is frequently found in the neighborhood of stables and dairies, where it finds abundance of mice upon which it largely feeds; it also eats other snakes.

The typical form is found in the south and differs from the variety *triangulus* in the color pattern.

Diadophis Bd and Gird.

Head depressed, distinct from neck. Two nasal plates, nostril between; two preoculars generally; one loreal. Scales smooth. Anal scutum and subcaudals bifid.

Diadophis punctatus (*Linn.*).

RING-NECKED SNAKE.

Upper labials eight, sixth and seventh largest. Two preoculars and two postoculars, subequal in size. Bluish black or dark gray above, with a yellow ring around the neck immediately behind the head. Under side, orange-yellow, with a median line of black spots generally

present. Tail immaculate. Length seldom exceeding fifteen inches.

This pretty little snake is somewhat rare, but may occasionally be seen under decaying logs and flat stones. A specimen from Fort Lee, New Jersey, measures twelve inches, with the tail two inches four lines inclusive ; its stomach contained a salamander (*Plethodon cinereus*).

Liopeltis Cope.

Head moderately distinct from neck. One nasal, containing the nostril ; one or two preoculars ; loral present. Body somewhat slender. Scales smooth. Anal plate and subcaudals divided.

Liopeltis vernalis (DeKay).

GREEN SNAKE.

Seven upper labials ; one (often two) anterior and two posterior oculars. Vertical plate longer than broad ; occipitals proportionally large. Tail about one-quarter of total length, which seldom exceeds two feet. Color above, uniform light green, excepting labials which are light yellow ; under side, pale yellow.

Specimens are recorded from numerous places in this vicinity, among them Staten Island ; the species is also found in moderate numbers in Rockland County, New York. In the stomach of a specimen from Connecticut were two crickets (*Gryllus pennsylvanicus*) and the larva of a noctuid moth, indicating that the species is insectivorous.

Opheodrys Fitz.

Head distinct, elongated. One nasal ; one preocular ; loral present. Body slender, tail long. Scales carinated. Anal plate and subcaudals divided.

Opheodrys æstivus (Linn.).

GREEN SNAKE.

Upper labials seven, the sixth largest ; two postoculars. Color above, light uniform green ; upper labials and under side, pale yellow. Average length, twenty inches six

lines, tail seven inches nine lines inclusive. Although this species is the same in coloration as *Liopeltis vernalis*, it may be easily distinguished by the carinated scales.

During a brief stay in Plymouth County, Connecticut, I found this species to be quite common; and, although the locality is not quite within the fifty-mile limit of this city, I have no hesitation in adding this snake to our local *Ophidia*, as the same character of country extends within the circumference of fifty miles and is undoubtedly frequented by the species, but no opportunity was offered me to investigate. Previously the northern limit was given as southern New Jersey; it is a common reptile in the Southern States.

Bascanion Bd. and Gird.

Head distinct, somewhat elongated. Two nasals; two preoculars; loreal present. Body rather slender. Scales smooth. Anal plate and subcaudal scuta bifid. The young of some of the species differ much from the adult in coloration, being spotted, while the latter are concolorous.

Bascanion constrictor (Linn.).

BLACK SNAKE.

Upper labials seven, sixth largest. Vertical plate about twice as long as broad. Two preoculars, the upper considerably the larger; two postoculars. Tail about one-quarter of total length. Color above and below, uniform black, although the under side is sometimes tinted with gray. Chin and throat milky white, the same color often present on upper labials. Average length, five feet.

A specimen, less than one week old, has the body light gray, with a series of distinct transverse dorsal blotches of brownish gray, which are darker at the edges. These blotches become gradually narrower and less distinct posteriorly and disappear almost altogether on the tail. Laterally are numerous dark spots, about the size of a scale. Under side grayish white with a row of black spots on each side, near the edges of the gastrosteges, and two

median rows which are less distinct. Length, thirteen inches seven lines.

Another specimen, fourteen months old, is very dark gray, but still shows the dorsal blotches, which are, however, black. Under side light gray, with the rows of spots showing distinctly. Chin and throat milky white. Length, twenty-six inches.

It would seem from the preceding, that the young take considerably over a year to acquire the intense black of the parent. The species is found in all the neighboring country, but is more frequently seen along the Hudson River Valley. The food consists of mice, birds, frogs, and other snakes, such as *Thamnophis sirtalis* and *T. saurita*, which fall easy victims to their larger and more powerful enemy. Contrary to the name, the species is not a constrictor, but holds its prey to the ground under a portion of the body, deglutition proceeding at the same time.*

Coluber Linn.

Head distinct from the neck. Two nasal plates; one preocular; loral present. Body of moderate thickness, flattened on the abdomen. Dorsal scales generally carinated. Anal plate and subcaudal scuta divided.

The species are large and powerful snakes, killing their prey by constriction before swallowing. They are beneficial in destroying small, injurious mammals, such as rats and mice, upon which they largely feed. Two species are recorded from the State, but only one is found in this vicinity.

Coluber obsoletus Say.

PILOT BLACK SNAKE.

Head gradually broadening posteriorly, flattened. Eight supralabials, seventh largest; two postoculars. Vertical plate nearly as broad as long. Dorsal scales weakly carinated; laterally the carinae are very indistinct. Above

* For this information I am indebted to Mr. G. R. O'Reilly, who has made a special study of the species.

shining black, excepting labials, which are white on the lower half with the perpendicular edges black. Anterior part of body beneath, white blotched with gray, becoming a slaty gray posteriorly; chin and throat immaculate white. On the side of the body numerous scales show white edges when the skin is distended. Length, often exceeding five feet. Tail, one-sixth of total length.

This is our largest species, and is not found in this immediate vicinity, but is recorded from the Highlands of the Hudson River. Although resembling in coloration *Bascanion constrictor*, it may be easily distinguished from that species by the carinated scales.

Heterodon Beauvois.

Body stout; head but little distinct. Posterior maxillary tooth considerably larger than those in front, but not grooved. Rostral plate upturned, its edge sharp and anterior surface flat; an azygos plate behind the rostral. Oculars numerous; labials not entering orbit. Scales carinated. Anal scutum and subcaudals bifid.

The species have the power of flattening the neck and head to a great extent when annoyed, somewhat resembling, in this respect, the species of *Naja*.

Heterodon platyrhinus Latr.

HOG-NOSED SNAKE.

Eight upper labials, the sixth and seventh largest. Occipitals about as broad as long. Labials prevented from entering orbit by the numerous orbital plates. Scales on the anterior half of the body narrow, becoming wider posteriorly and wide on the tail. Color generally yellowish brown, with dark brown or black irregular transverse blotches; these often are broken, forming three series of blotches, the dorsal series being largest. Beneath, yellow, with small black spots and blotches. Average length, two to two and a half feet.

One of the most variable of our species. A specimen from Fort Lee, New Jersey, has the ground color olivace-

ous, with the dark markings very indistinct; another from Greenville, New Jersey, has the ground color bright brick red, with the markings forming irregular black transverse bands.

The species is found in nearly all the sandy localities adjacent to this city, and is also found, although more sparingly, in wooded districts; specimens from the latter places are generally dark in coloring, while those found in dry sandy districts, particularly near the seashore, have the ground color much lighter. The food seems to consist almost entirely of toads, which are swallowed while alive; the reptile is then greatly aided by the long maxillary teeth, which hold fast the struggling prey.

Thamnophis Fitz.

Head distinct from neck. Posterior maxillary teeth longest, smooth. Two nasal plates; one loreal. Scales strongly carinated. Anal plate entire; subcaudal scuta divided. General marking, three light stripes on a darker ground.

The genus contains species distributed over the entire United States; they are remarkable for their variation and abundance. Two species are found in this vicinity.

Thamnophis saurita (Linn.).

RIBBON SNAKE.

Upper labials seven, fifth largest. Vertical plate narrow. One large preocular and three small postoculars. Body very slender; tail long, about one-third of the total length. Coloration: Head brown above, with the labials yellow; portion of preocular bounding orbit and lower postocular also yellow. Body above, brown, sometimes black, with a distinct and clearly defined dorsal stripe of light yellow, occupying the median row of scales and half a scale on each side. In the brown specimens there is a black stripe on each side of the dorsal stripe, half a scale wide. Lateral stripe of same color as dorsal on third and fourth rows

of scales. Ends of gastrosteges and first and second rows of scales, brown. Under side, very pale yellow. Skin along the sides, when distended, shows white lineate spots. Length seldom exceeds three feet.

This active snake frequents damp meadows and grassy banks of streams, feeding on small fishes, tadpoles, frogs, etc. Four captive females gave birth to young, as follows : August 1, five young ; August 12, three young ; August 17, ten young ; August 26, six young. From the above, it would seem that the number of young brought forth is small. This is confirmed by Mr. G. R. O'Reilly, who tells me that, in all his observations on this species, the number of young was invariably small. The young resemble the parent, excepting that the ground color is of a lighter shade, and also the stripes.

***Thamnophis sirtalis* (Linn.).**

GARTER SNAKE.

Head rather narrow, slightly wider posteriorly. Seven upper labials, fifth and sixth largest. One preocular and three postoculars. Body moderately stout, with a greenish yellow dorsal stripe occupying median row of scales and a half row on each side. Lateral stripe on second and third rows of scales, less distinct than dorsal stripe and generally darker. Ground color, generally dark brown, showing two rows of dark quadrate spots arranged in tessellate fashion. Head above of same color as body, with the labials greenish yellow, some of the posterior ones edged with black. Under side, greenish yellow, with a black spot on the anterior edges of gastrosteges near the ends. Skin along the sides showing white lineate spots, when distended. Length, from two to three feet.

This species presents great variation, two specimens seldom being exactly alike. The ground color varies from brown to red and green. The stripes on many specimens are very indistinct and often entirely wanting. One distinct variety occurs.

Thamnophis sirtalis ordinata (Linn.).

Color green or olive, with the lateral stripes wanting; dorsal stripe very indistinct or entirely absent. Two rows of distinct dark quadrate spots on each side. Gastrosteges showing usual black spots. Taken in a swampy locality on Long Island, New York, and at Fort Lee, New Jersey.

The garter snake is our most common species, being found in numbers, even in Central Park. It is equally abundant in the swamps of New Jersey, and at an elevation of over two thousand feet on rocky ground in the Catskill Mountains. The number of young produced often exceeds thirty; they feed on earthworms, as well as small Batrachians, and grow very rapidly. They exhibit much the same coloration as the adult, but present a more spotted appearance.

Natrix Laur.

Head distinct from neck, scuta normal. Two nasals; loreal present. Scales strongly carinated. Anal scutum and subcaudals bifid.

Two species are recorded from this State, *N. leberis* and *N. fasciata sipedon*, but as to the former, little seems to be known. Holbrook* mentions it from New York State and Baird includes it in his list of *Ophidia* of the State, but does not give the locality. As there is no authentic record of its being taken in this vicinity, it would not seem reasonable to include the species among our local *Ophidia*. The latter snake, a variety of *N. fasciata* of the Southern States, is one of our most common reptiles.

The species are semi-aquatic, living along the borders of streams and lakes; when alarmed, they generally glide into the water and, diving to the bottom, remain there for a short time.

Natrix fasciata sipedon (Linn.).

WATER SNAKE.

Eight upper labials, increasing in size to seventh; eighth

* North American Herpetology, Part IV., 1842, p. 51.

smaller than seventh. Vertical plate longer than broad ; one preocular and three postoculars. Body rather stout ; brown with irregular reddish brown transverse bands, which show more clearly on the sides ; beneath, yellowish white with numerous red spots. Subject to variation, both in the ground color and width of the bands. Some specimens are very dark, the bands being scarcely perceptible. Length, from two and a half to four feet.

This snake may be seen in numbers along slow-running streams, either sunning on the banks or stretched upon the branches of bushes that overhang the water. It feeds upon frogs, toads, fishes, etc. A captive female gave birth to twenty-two young on August 17th, and another to twenty-eight young on September 6th. In the young the ground color is gray with the bands very dark brown, often black ; thus making the markings much more distinct than in the adult.

Storeria Bd. and Gird.

Head distinct. Two nasal plates; one or two preoculars; no loreal. Tail rather short. Scales carinated. Anal plate and subcaudal scuta divided.

Storeria dekayi (Holb.).

BROWN SNAKE.

Seven supralabials, rather uniform in size. One preocular and two postoculars ; nostril between the nasals. Scales in seventeen rows, all carinated. Color, brown or brownish gray above, with an indistinct lighter dorsal band margined by small blackish spots, which sometimes run together on the posterior part of the body, forming two faint blackish vertebral stripes. Beneath, pinkish white. Length seldom exceeds fifteen inches.

The species is generally distributed, and is quite common in rocky portions of Central Park. It is usually found under flat rocks, and feeds largely upon earthworms. A specimen in my collection gave birth to eighteen young on July 31st, and one in the collection of Mr. G. R. O'Reilly

gave birth to fifteen young on August 8th. The young differ from the parent, being black above, with a white patch extending around the neck. At this stage they somewhat resemble a small *Diadophis punctatus*.

***Storeria occipitomaculata* (Storer).**

RED-BELLIED BROWN SNAKE.

Upper labials generally six, sometimes five. Two preoculars and two postoculars; nostril in the posterior part of the anterior nasal plate. Scales in fifteen rows, all carinated. Color above, brown or gray with a paler dorsal stripe generally present, margined by small blackish spots which, on some specimens, run together, forming two black vertebral stripes. Beneath, bright red. Length, about the same as the preceding species, but *S. dekayi* probably reaches a larger size than this species.

This handsome little snake is not found in the immediate vicinity of this city, but is common northward. Specimens are recorded from Putnam County, New York. The young resemble those of *S. dekayi*.

SOLENOGLYPHA.

CROTALIDÆ.

Agkistrodon Beauvois.

Head with a deep pit in the loreal region, and with nine plates above. Scales carinated; subcaudals nearly all entire. Body stout; tail ending in a blunt horny spine.

This genus together with *Crotalus* are the only genera of venomous snakes represented in this vicinity, each presenting one species. Both may be easily recognized by the presence, as in all the *Crotalidæ*, of a deep pit between the eye and nostril, and the elliptical pupil. The maxillary bones bear only the two long poison fangs; the palatine bones are toothed.

Agkistrodon contortrix (*Linn.*).

COPPERHEAD SNAKE.

Head triangular, very distinct from neck. Eight upper labials, third and fourth largest; second forming anterior border of pit; none entering orbit. Two anteoculars; loreal present. General coloration, light brown, with dark reddish-brown transverse blotches, which are darker at the edges. These blotches are narrow dorsally, becoming much wider on the side. In some specimens many of the bands are very narrow on the back, and some are broken dorsally, making large blotches on the sides which are narrow on top and much wider below, somewhat like a V with the point upwards. Head of a slightly lighter shade than body, with the sides light yellowish brown, the line of intersection of this color and the hazel-brown of the top, beginning behind the eye and running to the angle of the mouth. Body beneath, pinkish white with two rows of reddish-brown blotches. Upper side and portions of under side profusely sprinkled with small black spots.

This beautiful and dangerous species is, fortunately, of not common occurrence near this city. On the Palisades, in the vicinity of Alpine, New Jersey, many specimens were killed during the past summer (1895); they were also recorded from Putnam, Westchester, and Dutchess Counties, New York, and in the latter county were said to be quite common. The species seems to prefer the neighborhood of thick woods, where swampy ground or a bog is not far distant. Their food consists of frogs, small mammals, and birds, but of the former they seem especially fond, and probably feed largely on the Wood Frog (*Rana sylvatica*) that is abundant in places frequented by the reptile.

A specimen in the collection of Mr. G. R. O'Reilly gave birth to six young on August 9th, and another one to nine young on the tenth of the same month. The young have the colors lighter and the pattern more distinct than the parent, and the tail, for about three-quarters of an

inch is of a bright sulphur yellow. The parent snakes measured about two and a half feet each and the young ten inches.

Crotalus Linn.

Head with small scales between the superciliaries and posteriorly; a few small plates anteriorly. Body stout; tail ending in a rattle. Urosteges entire.

Crotalus horridus Linn.

BANDED RATTLESNAKE.

Head very distinct; superciliaries large; two anterior and five or six posterior frontals. Supralabials twelve or more, separated from the orbit by two rows of scales as well as orbital plates, which are numerous. General color above, dark sulphur-yellow, with a series of irregular black transverse bands, which are, in many individuals, broken into a series of dorsal subrhomboids and smaller blotches laterally. Along the median part of the back runs an indistinct line of reddish-brown, for the width of about three scales. Tail black. Under side, bright yellow, profusely sprinkled with black spots. Average length, three feet.

This species varies considerably in the ground color as well as pattern. Some specimens are almost entirely black above, the pattern being scarcely visible, while others are sulphur-yellow with black bands, with or without the vertebral stripe. A good example of the variation of pattern is shown in two specimens from Connecticut. One has the bands running from side to side unbroken, with the median dorsal stripe present; the other has the bands broken, forming a subrhomboidal dorsal pattern with a smaller round blotch on the side beneath each subrhomboid, and the dorsal stripe is absent.

The Rattlesnake is becoming very rare within fifty miles of this city, the nearest locality in which it has been found in the last few years being Putnam County, New York, near the Hudson River; it also occurs in Connecticut, and Professor E. B. Southwick tells me that a few are found annually in the central part of Long Island.

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ERRATA.

Page 16, lines 18 and 29, For Coluber, read Callopeltis.

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1896-97.

No. 9.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK

For the Year Ending March 9, 1897,

WITH

THE FISHES OF THE FRESH AND BRACK-
ISH WATERS IN THE VICINITY OF
NEW YORK CITY.

BY EUGENE SMITH.

The Society meets on the second and fourth Tuesday evenings of each month at the American Museum of Natural History, 77th Street and 8th Avenue, New York City.

PUBLICATIONS OF The Linnæan Society of New York. TRANSACTIONS.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPIECE--PORTRAIT OF LINNÆUS.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTH-EASTERN NEW YORK. By CLINTON HART MERRIAM, M. D.

General introduction. Mammalia: Carnivora. Biographies of the Panther, Canada Lynx, Wild Cat, Wolf, Fox, Fisher, Marten, Least Weasel, Ermine, Mink, Skunk, Otter, Raccoon, Black Bear, and Harbor Seal.

IS NOT THE FISH CROW (*Corvus ossifragus* Wilson) A WINTER AS WELL AS A SUMMER RESIDENT AT THE NORTHERN LIMIT OF ITS RANGE? By WILLIAM DUTCHER.

A REVIEW OF THE SUMMER BIRDS OF A PART OF THE CATSKILL MOUNTAINS, WITH PREFATORY REMARKS ON THE FAUNAL AND FLORAL FEATURES OF THE REGION.

New York, December, 1882. By EUGENE PINTARD BICKNELL.

Price: Paper, - \$2.00. Cloth, - \$3.00.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume II., Royal Octavo, 233 pp. Contents: FRONTISPIECE—PLATE OF BENDIRE'S SHREW.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTH-EASTERN NEW YORK. (MAMMALIA CONCLUDED.)

By CLINTON HART MERRIAM, M. D.

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DESCRIPTION OF A NEW GENUS AND SPECIES OF THE SORICIDÆ. (*Atophyrax bendirii*, with a plate.)

New York, August, 1884. By CLINTON HART MERRIAM, M. D.

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ABSTRACT OF PROCEEDINGS.

ABSTRACT OF PROCEEDINGS OF THE LINNÆAN SOCIETY OF NEW YORK.

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ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK,
FOR THE YEAR ENDING MARCH 9, 1897.

This is the ninth in the series of "Abstracts" published by the Linnæan Society of New York, and, like the preceding issues, is prepared mainly as a brief review of the work of the Society during the year closing with the date indicated above. When papers have been elsewhere printed, the customary reference is given.

April 14, 1896.—Mr. William Ellsworth in the chair. Six members and two visitors present.

Mr. H. R. Taylor presented a paper on "Individuality in Eggs of Particular Pairs of Birds." This paper instanced cases of marked similarity in sets of eggs from the same nests and, presumably, from the same pairs of birds in the Golden Eagle (*Aquila chrysaetos*), the Red-shouldered Hawk (*Buteo lineatus*), the Kentucky Warbler (*Geothlypis formosa*), and the Spurred Towhee (*Pipilo maculatus megalonyx*). [See *Nidologist*, IV, p. 51.]

Mr. L. S. Foster read the notes on the Tyrannidæ of this vicinity collected by the Local Fauna Committee of this Society and made comparisons with the work of the Delaware Valley Ornithological Club on this same family of birds. Ten New York species were remarked upon.

Mr. S. H. Chubb stated that he had seen Purple Grackles (*Quiscalus quiscula*) in Central Park, New York City, on April 12, of this year.

Mr. E. I. Haines had observed Pine Warblers (*Dendroica vigorsii*) at New Rochelle, N. Y., on March 27, 1896.

April 24, 1896.—The President in the chair. Nine members and five visitors present.

Mr. Anton H. Schroeter was elected a Resident Member of the Society.

Mr. William Dutcher remarked upon the continued need of protection for our birds. The Society appropriated the sum of fifteen dollars to be used for the protection of terns on Great Gull Island, New York.

Mr. William Dutcher presented to the Society, for conveyance to the Local Collection of Birdskins in the American Museum of Natural History, a skin of the Snow Goose (*Chen hyperborea*).

Dr. J. A. Allen exhibited a skin with the accompanying skull of *Ichthyomys stolzmanni*, a fish-eating rodent from Peru. This is the second known specimen of this animal.

Mr. R. L. Ditmars presented a paper on Sea Snakes (*Hydrophidae*). Mr. Ditmars stated that eight genera, including forty-four species of these snakes are recognized. Sea eagles and sharks are among their enemies. Eight alcoholic specimens were shown.

Mr. C. C. Young said that he had observed a small colony of Black-crowned Night Herons (*Nycticorax nycticorax naevius*) breeding at Port Daniel, Province of Quebec, Canada, in the spring of 1895.

May 12, 1896.—Mr. William Ellsworth in the chair. Seven members and one visitor present.

Mr. Newbold Edgar presented to the Library of the Society an original copy of "Fragments of the Natural History of Pennsylvania," by Benjamin Smith Barton, M. D. (Philadelphia, 1799). The autograph signature of Dr. Barton, written in 1810, was shown.

Mr. E. I. Haines presented a paper entitled "The Starlings at Home and Abroad."

Mr. L. S. Foster reported that on May 10, 1896, he saw a Solitary Sandpiper (*Totanus solitarius*) at Elmsford, Westchester County, New York, and that a single White-crowned Sparrow

(*Zonotrichia leucophrys*) was seen by him in New York City, on April 24, 1896.

A paper sent by the author, Mr. A. H. Howell, was read by the Secretary. It was entitled "Notes on the Early Spring Migrants of 1896 at Lake Grove, Suffolk County, New York," and treated of thirty-nine species.

May 26, 1896.—The President in the chair. Eight members and four visitors present.

Mr. Bancel LaFarge was elected a Resident Member of the Society.

Mr. F. M. Chapman presented "Notes on Birds Observed in Yucatan." [See Bull. Am. Mus. Nat. Hist., VIII, pp. 271-290.]

Mr. F. M. Chapman exhibited the skin of a Mexican Cardinal, in which the colors of some of the feathers had been artificially changed.

Mr. C. W. Vaughan stated that he had seen a Mourning Warbler (*Geothlypis philadelphia*) in Central Park, New York City, on May 19, of this year.

R. T. Morris, M. D., had found the Great Black-backed Gull (*Larus marinus*) and the Canada Goose (*Branta canadensis*) breeding on the north shore of the Gulf of St. Lawrence during the summer of 1895.

October 13, 1896.—The President in the chair. Eight members and seven visitors present.

A report was read from the Game Protector on Great Gull Island—Mr. H. P. Field. This report showed a satisfactory state of affairs there, the colony of terns having largely increased in numbers owing to the labors in behalf of bird protection of Mr. Field, under the direction of Mr. William Dutcher of this Society.

J. A. Allen, Ph. D., presented a paper entitled "Notes of a Visit to Some of the Natural History Museums of Europe." This paper included remarks upon the museums of London, Tring, Leyden, Berlin, Vienna, Munich and Paris.

E. A. Mearns, M. D., sketched in outline his three years' work on the Mexican Boundary Survey, giving topographical and faunal details of the region traversed.

October 27, 1896.—Mr. L. S. Foster in the chair. Six members and three visitors present.

Mr. E. I. Haines read a paper entitled "Birds of the vicinity of Stamford, Delaware County, New York; a list of the summer residents with evidences of the Carolinian, Canadian and Hudsonian Faunas." Mr. Haines enumerated one hundred and fifteen species of birds observed by him within ten miles of Stamford, New York, in the month of July, 1896.

November 24, 1896.—The President in the chair. Seven members and four visitors present.

Mr. L. S. Foster presented to the American Museum of Natural History, through the Linnæan Society, the Alfred Marshall collection, consisting of 320 birdskins and 261 sets of birds' eggs.

Jonathan Dwight, Jr., M. D., presented a paper entitled "Some Moulting Birds." This paper was illustrated by a large series of the skins of moulting birds, and Dr. Dwight described the process of moulting, as he had observed it, in many species.

Mr. L. S. Foster read "A Summary of Bird Notes from Greene County, New York." The list included sixty-seven species.

December 8, 1896.—The Vice-President in the chair. Twelve members and six visitors present.

An appropriation was made for the usual winter course of public lectures.

Mr. E. I. Haines presented "Remarks on the Ruby-crowned Kinglet."

Mr. F. M. Chapman made extended remarks upon "An Ornithological Reconnaissance in Mexico," describing the features of the region visited and many of its birds. This trip was taken by him in the spring of 1896.

December 22, 1896.—Mr. L. S. Foster in the chair. Seven members and six visitors present.

Mr. R. L. Ditmars read a paper entitled "Notes on the Habits of Some Trinidad Snakes." This paper was illustrated by living specimens of some of the species under consideration.

Mr. E. I. Haines presented a paper entitled "Bird Notes at Christmas-tide."

January 12, 1897.—The Vice-President in the chair. Seven members and six visitors present.

Miss E. A. Foster was elected a Resident Member of the Society.

Mr. William Dutcher read an autograph letter from Audubon, dated Edinburgh, June 19, 1838. It contained many matters of ornithological interest.

In the absence of the author, Mr. F. M. Chapman read a paper by Dr. Juan Vilaró, entitled "Hybridism Among Cuban Gallinæ." The paper treated particularly of hybrids between the Guinea Fowl (*Numida meleagris*) and the common domestic fowl of Cuba (*Gallus bankiva*). Four mounted specimens of these hybrids were shown. [See Bull. Am. Mus. Nat. Hist., IX, pp. 225-230, pll. xxv and xxvi.]

January 14, 1897.—Public lecture in the lecture hall of the American Museum of Natural History, by William Libbey, Sc. D. entitled "Four Months in the Sierra Madre of Mexico," with stereopticon illustrations.

January 26, 1897.—The Vice-President in the chair. Eleven members and twenty-two visitors present.

Mr. S. Nicholson Kane was elected a Resident Member of the Society.

Mr. R. L. Ditmars presented a paper entitled "Notes on the Breeding of Viperine Snakes in Captivity." Mr. Ditmars had successfully raised broods of the Water Moccasin (*Agkistrodon piscivorus*), the Copperhead (*Agkistrodon contortrix*), and the Rattlesnake (*Crotalus horridus*). The paper was illustrated by living specimens.

Mr. G. R. O'Reilly gave an account of "How Snakes Find their Prey," his remarks being based upon his own experiences with snakes in South Africa, the Island of Trinidad, Venezuela, and New Jersey. Mr. O'Reilly exhibited the following living snakes: three Tree Boas (*Corallus cookei*), a young Boa Constrictor (*Boa constrictor*), a Black Snake (*Bascanion constrictor*), and two specimens of Copperheads (*Agkistrodon contortrix*).

February 9, 1897.—The President in the chair. Ten members present.

J. A. Allen, Ph. D., presented remarks on "Some Mammals

from Mexico and Central America," using, as a text, specimens recently collected by Messrs. F. M. Chapman, G. K. Cherrie, A. Alfaro and A. C. Butler. [See Bull. Am. Mus. Nat. Hist., IX, pp. 31-58.]

Mr. E. I. Haines read a paper entitled "Notes on the White-breasted Nuthatch."

February 13, 1897.—Public lecture in the lecture hall of the American Museum of Natural History, by Mr. Frank M. Chapman, entitled "A Little Journey in Yucatan," with stereopticon illustrations.

February 23, 1897.—The President in the chair. Ten members and eight visitors present.

Mr. Eugene Smith presented a paper entitled "The Fishes of the Fresh and Brackish Waters in the Vicinity of New York City." [Printed at the end of this abstract.]

Dr. Tarleton H. Bean mentioned the occurrence of the Drum (*Pogonias chromis*) and the Banded Larimus (*Larimus fasciatus*), in the vicinity of New York City. He also spoke of the capture of the White-fish (*Brevoortia tyrannus*) in Canandaigua Lake, and the taking of the Yellow Perch (*Perca americana*) and the Carp (*Cyprinus carpio*) in salt water.

March 9, 1897.—Annual Meeting. The President in the chair. Eight members and ten visitors present.

The Secretary presented his annual report, as follows:

"There have been held during the year 14 meetings of the Society, being two more than were held last year. The meeting on the second Tuesday in November was omitted in consequence of the meeting that week of the American Ornithologists' Union at Cambridge, Mass. At no meeting has there been a failure to secure a quorum.

"The average attendance of members during the year has been 9 and of visitors 6. The total number of persons present at all the meetings was 197, of whom 122 were members and 75 visitors—a decrease from the total attendance of last year of 11. The largest attendance at any one meeting has been of members 15 and of visitors 22.

"There have been elected to the Society five Resident Members; two Resident Members have been changed to Corres-

ponding, and five members have resigned. The membership of the Society at present is—Resident 149, Corresponding, 39, Honorary 2—a total of 190.

“The Society has lost by death G. A. Sabine, M. D., a Resident Member, and Major Charles Bendire, a Corresponding Member.

“There have been read before the Society 24 papers, of which 14 related to ornithology, 4 to mammalogy, 5 to herpetology, and one to ichthyology. These 24 papers were presented by 10 persons.

“The Society has issued ‘Abstract of Proceedings No. 8,’ to which were added ‘The Snakes Found within Fifty Miles of New York City,’ by Mr. R. L. Ditmars, and an index, the whole forming a pamphlet of 27 pages. One copy has been given to each member and the usual exchanges made.”

The Librarian presented his annual report, as follows :

“There have been added to the Library this year, mainly through exchange, about 150 pamphlets, making the total number of publications now in the Library about 1,500. The work of cataloguing these has, for the present, been discontinued.”

The Treasurer presented his annual report, showing a balance on hand of \$246.04.

The following officers were elected for the ensuing year :

President, Mr. Frank M. Chapman.

Vice-President, Jonathan Dwight, Jr., M. D.

Secretary, Mr. Walter W. Granger.

Treasurer, Mr. L. S. Foster.

Mr. E. I. Haines presented a paper entitled “Evidence of the Carolinian Fauna in the Catskill Mountains.”

Mr. G. R. O'Reilly presented extended remarks, illustrated by living specimens of snakes, on “Snake Hunting in the Orinoco Delta.” He described the topography of the region, its animal life, and the methods employed by himself in capturing snakes.

The Fishes of the Fresh and Brackish Waters in the Vicinity of New York City.

BY EUGENE SMITH.

In the following paper is given an enumeration of the species of fishes found in the vicinity of New York City, in both fresh and brackish water. In the first list are given the fishes found by me ; in the second list those not found by me, but known to occur from statements of reliable observers who give the localities where they found them ; in the last list those whose actual occurrence within our limits is not authenticated, but most of which will probably be found on further search ; a few may be extra-limital.

Fishes by reason of their aquatic residence are perhaps the most elusive of all the Vertebrates, hiding as many of them do, in dark and inaccessible places, among brush and weeds or burrowing in the mud. Often a find is made of a species whose existence at that particular spot was never thought of.

The district embraced in this list includes parts of the States of New York and New Jersey: The valley of the Hackensack River, the main valley of the Passaic River with its northern and eastern affluents, the lower part of the Bronx River, Staten Island, the western part of Long Island, and part of the region tributary to the Navesink River in New Jersey. The Hudson River in the nearby vicinity of New York is of the nature of a marine inlet and has therefore no strictly fresh water species.

The above district embraces most of the territory immediately tributary to New York harbor taken in its largest sense. From the Raritan River no fishes are included as of my own knowledge, but under the third list I enumerate species which are known from there.

For that part of New Jersey lying within Hudson County and the southern part of Bergen County (the lower Hackensack Valley), my list will be found as complete as many years of continued search can make it.

Under the fishes of the brackish water are included all those which are anadromous, *i. e.*, run up from the sea to spawn, as well as many of those which are found perennially about the lower river reaches open to the influx of salt water. Of these a number are still found where the waters are entirely fresh, though subject to the flow of the tides; such might not inappropriately be called tidal fishes. Distinctly marine species are not given, though they may accidentally wander into river estuaries.

Special localities of occurrence I give in such cases where the fishes are known to me only from certain isolated points; all others are of a more general distribution throughout our area.

In the tidal parts of the Hackensack Valley the collecting of specimens was done mostly by means of the seine, the fyke and the casting net; in other waters by means of the bait seine and the common ring or shrimp net. Lastly, some species were only taken by angling for them.

For the descriptions I have largely used Prof. Jordan's "Manual of the Vertebrated Animals of the Northern United States;"¹ also A. C. Günther's "Ichthyology" in the Encyclopedia Britannica,² embodying my own observations and experiences and supplementing them in many cases by statements from various authors. Diligent search of all accessible literature has shown me that no thorough attempt has ever been made to cover the local fish fauna. The list of fishes given in the "Descriptive Catalogue of the Vertebrates of New Jersey" (a revision of Dr. Abbott's "Catalogue" of 1868), by Julius Nelson,³ is largely tentative, and does not give sufficient information as to the real occurrence of the species mentioned, except for the southern part of the state and the Delaware Valley, both of which regions are beyond our limits.

¹ Sixth edition, Chicago, 1894.

² Ninth edition, Vol. XII, N. Y., 1881.

³ Final report of the State Geologist, Vol. II, Pt. 2, Trenton, 1890.

The nomenclature adopted is in accordance with the "Bulletin of the U. S. National Museum, No. 47, the Fishes of North and Middle America, by D. S. Jordan and B. W. Evermann, Washington, 1896."

All statements which are made on the authority of others are credited to them. In order not to increase the volume of this paper, I refrain from entering upon full descriptions, but will confine myself to the more salient features of the subject. The local fauna then stands (classified in upward series), as follows:

THOSE FOUND BY ME.

Family Petromyzontidae.—*Lampreys*.

GENUS AND SPECIES.

Petromyzon marinus L.

Family Siluridae.—*Catfishes*.

GENERA AND SPECIES.

Ameiurus catus (L.), *Ameiurus nebulosus* (Les.), *Schilbeodes gyrinus* (Mitch.).

Family Catostomidae.—*Suckers*.

GENERA AND SPECIES.

Catostomus commersonii (Lac.), *Catostomus nigricans* (Les.), *Erimyzon sucetta* (Lac.).

Family Cyprinidae.—*Minnows and Carps*.

GENERA AND SPECIES.

Notropis procne (Cope), *Notropis cornutus* (Mitch.), *Rhinichthys atronasmus* (Mitch.), *Hybopsis kentuckiensis* (Raf.), *Semotilus corporalis* (Mitch.), *Abramis crysoleucas* (Mitch.), *Cyprinus carpio* L. and varieties, *Carassius auratus* (L.).

Family Clupeidae.—*Herrings*.

GENERA AND SPECIES.

Pomolobus pseudoharengus (Wilson), *Pomolobus æstivalis* (Mitch.), *Alosa sapidissima* (Wilson), *Brevoortia tyrannus* (Latrobe).

Family Salmonidae.—*Salmons*.

GENUS AND SPECIES.

Salvelinus fontinalis (Mitch.).

Family Argentinidae.—Smelts.

GENUS AND SPECIES.

Osmerus mordax (Mitch.).

Family Poeciliidae.—Killifishes.

GENERA AND SPECIES.

Cyprinodon variegatus Lac., *Fundulus majalis* (Walb.),
Fundulus heteroclitus (L.), *Fundulus diaphanus* (Les.),
Lucania parva (Bd. and Gir.).

Family Umbridae.—Mud Minnows.

GENUS AND SPECIES.

Umbra pygmaea (De Kay).

Family Luciidae.—Pikes.

GENUS AND SPECIES.

Lucius americanus (Gmel.), *Lucius reticulatus* (Les.).

Family Anguillidae.—Eels.

GENUS AND SPECIES.

Anguilla chrysopa Raf.

Family Esocidae.—Needlefishes.

GENUS AND SPECIES.

Tylosurus marinus (Walb.).

Family Gasterosteidae.—Sticklebacks.

GENERA AND SPECIES.

Pygosteus pungitius (L.), *Gasterosteus bispinosus* Walb.,
Apeltes quadracus (Mitch.).

Family Atherinidae.—Siversides.

GENUS AND SPECIES.

Menidia notata (Mitch.).

Family Pomatomidae.—Bluefishes.

GENUS AND SPECIES.

Pomatomus saltatrix (L.).

Family Centrarchidae.—Sunfishes.

GENERA AND SPECIES.

Ambloplites rupestris (Raf.), *Acantharchus pomotis* (Bd.),
Enneacanthus obesus (Bd.), *Lepomis auritus* (L.),
Eupomotis gibbosus (L.), *Micropterus dolomieu* (Lac.),
Micropterus salmoides (Lac.).

Family Percidae.—Perches.

GENERA AND SPECIES.

Boleosoma nigrum olmstedii (*Storer*), *Etheostoma flabellare*
Raf., *Perca flavescens* (*Mitch.*).

Family Serranidae.—Sea Basses.

GENERA AND SPECIES.

Roccus lineatus (*Bloch*), *Morone americana* (*Gmel.*).

Family Sciaenidae.—Croakers.

GENUS AND SPECIES.

Leiostomus xanthurus *Lac.*

Family Cottidae.—Sculpins.

GENUS AND SPECIES.

Uranidea gracilis (*Heckel*).

Family Gadidae.—Codfishes.

GENUS AND SPECIES.

Microgadus tomcod (*Walb.*).

Family Pleuronectidae.—Flounders.

GENUS AND SPECIES.

Achirus fasciatus *Lac.*

Fishes Known to Occur Here, but Not Collected by Me.
(Mostly Introduced Species.)

Family Accipenseridae.—Sturgeons.

GENUS AND SPECIES.

Accipenser sturio *L.*, *Accipenser brevirostrum* *Les.*

Family Salmonidae.—Salmons.

GENUS AND SPECIES.

Salmo salar *L.*, *Salmo fario* *L.*

Family Percidae.—Perches.

GENUS AND SPECIES.

Stizostedion vitreum (*Mitch.*).

Family Serranidae.—Sea Basses.

GENUS AND SPECIES.

Roccus chrysops (*Raf.*).

**Native Fishes Found in Contiguous Areas, Which May Yet
Be Found Within Our Limits; and Fishes of
Doubtful Occurrence.**

Family Catostomidae.—Suckers.

GENUS AND SPECIES.

Moxostoma macrolepidotum Les.

Family Cyprinidae.—Minnows and Carps.

GENERA AND SPECIES.

Hybognathus nuchalis Ag., *Pimephales promelas* (Raf.),
Pimephales notatus (Raf.), *Notropis bifrenata* (Cope),
Notropis hudsonius (Clinton), *Notropis analostanus*
(Gir.), *Notropis amoenus* (Abbott), *Rhinichthys catar-*
actae (Cuv. & Val.), *Semotilus atromaculatus* (Mitch.).

Family Salmonidae.—Salmons.

GENERA AND SPECIES.

Oncorhynchus tshawytscha (Walb.), *Salmo irideus* (Gibbons).

Family Aphredoderidae.—Pirate Perches.

GENUS AND SPECIES.

Aphredoderus sayanus (Gilliams).

Family Centrarchidae.—Sunfishes.

GENUS AND SPECIES.

Pomoxis sparoides (Lac.).

Family Percidae.—Perches.

GENUS AND SPECIES.

Boleichthys fusiformis (Gir.).

We will now take up the species in proper order of zoölogical position, beginning with the lowest.

Class Cyclostomi.

ROUND MOUTHS.

In this small class the skeleton is cartilaginous and notochordal. There are no limbs and no shoulder and pelvic arches. Proper jaws are absent, the mouth being suctorial with a nearly circular lip. The stomach and the intestinal canal are simple and direct, without appendages. The vertical fins are rayed. The heart is simple with one auricle and one

ventricle, but without the arterial bulb. The gills consist of fixed sacs, six or seven on each side. Nasal aperture one, situated on the head in front of the eyes.

Family Petromyzontidae.

LAMPREYS.

The body is eel-shaped, naked. The gills are seven on each side; the nostril does not open through to the palate; the mouth is placed somewhat inferiorly, and is adapted to sucking, for it is in that way that the lampreys obtain their food, using their numerous teeth to scrape and rasp the flesh off the bodies of the unfortunate fish and other animals to whom they may have attached themselves. The eyes, developed in the adult, are rudimentary in the young; the latter are larval with a continuous vertical fin, an imperfect mouth and no teeth.

Lampreys are called "seven eyes" from the seven gill openings; and "nine eyes" counting the gill openings, the eye and the nostril, the last being counted in, once for each side.

***Petromyzon marinus* L.**

SEA LAMPREY.

This species is found along the colder parts of both sides of the Atlantic Ocean, ranging south to Virginia on our coast. It is anadromous, ascending into small brooks to spawn, where it builds so-called "nests" of stones and pebbles, within which the spawn is deposited. It is supposed that after spawning the adults die, as they disappear soon after.¹

Lampreys are often found attached to sturgeons and salmon as parasites. The mouth is full of teeth, which here are horny excrescences resting on soft papillæ. They are in bands or laminae around the mouth and have several cusps. The teeth situated further out (lateral) are bicuspid in the first row, the others simple. The anterior lingual tooth has a deep median groove. The dorsal fin is divided into two parts; the rear part merges into the caudal fin. The color of large specimens is dark brown, mottled usually with blackish. They grow to a length of three feet.

¹ Thoreau. A week on the Concord and Merrimack Rivers. A. Dumeril. Les Poissons voyageurs, anadrômes et catadrômes.

I have had lampreys full of ova when not more than four and one-half inches long; these were of a bluish grey color and died within a few days after removal from the brook, seemingly requiring cold running water.

From the fact of their having spawn when of such a small size, I would suggest the propriety of maintaining the subspecies or variety *Petromyzon marinus nigricans* of Lesueur, although the latter has lately been regarded as merely the young of the sea lamprey.

Class Pisces.

FISHES.

A fish is an aquatic vertebrate, with a developed skull and a lower jaw; the limbs are weak; four, two or rudimentary, forming the pectoral and ventral fins. The dorsal, caudal and anal fins are part of the mechanism of locomotion, of the nature of keels and rudders. A fish swims mostly by means of his tail, the limbs serving only for the subsidiary movements, in some cases also for walking, *i. e.*, crawling along the bottom or climbing up stones, logs, etc. The shoulder girdle is almost always attached to the skull by clavicle bones, and is sometimes rudimentary. The pelvic arch is frequently only embedded in the muscles or it may be rudimentary, or altogether absent. The skin is either naked, or covered with scales or plates of a horny or bony texture. The respiratory organs, called gills, are comb-like plates attached to the gill arches; the swim bladder, when present, sometimes gives indications of being a sort of lung.

Sub-class Teleostomi.

PERFECT OR TRUE MOUTHS.

The skeleton is developed; the gills (usually four pairs) are attached to the arches by the bases only and are covered by the opercles; the gill opening behind and below the opercles is single on each side. The heart has one auricle, one ventricle, and an arterial bulb. The hemispheres of the brain are not united.

Series Ganoidei.

The skeleton is cartilaginous or ossified. The tail is heterocercal or diphyocercal; some fins have fulcra. The exo-skele-

ton is either naked, plated or scaled. The arterial bulb is muscular and contractile with many valves; the air bladder has a pneumatic duct; the intestine a spiral valve. The terminal point of the notochord is never ossified. The embryo is sometimes provided with external gills.

Family Accipenseridæ.

STURGEONS.

This family of Ganoids, which were so numerous in earlier geological times, is characterized by the long fusiform body; the skin is covered with five rows of bony keeled shields, between which are smaller plates. The snout is long, the mouth inferior, protractile and toothless; there are four barbels in a row in front of the mouth. The maxillary is present, the opercle rudimentary. The vertical fins have springlike projections on the front rays, called fulcra. There are four gills, no branchiostegals. The ova are fertilized after extrusion, as in most fishes.

***Accipenser sturio* L.**

STURGEON.

The common sturgeon is found along the Atlantic coast from the Carolinas northward; it is anadromous and common in the Hudson River, where it is regularly fished for. This is one of the fishes now being re-introduced by the U. S. Fish Commission in many rivers from which it has well nigh disappeared. The Sturgeon grows to an extreme length of twelve feet. It is a food fish of no low rank.

***Accipenser brevirostrum* Les.**

SHORT-NOSED STURGEON.

This species has a blunt snout which is much shorter than the rest of the head. It occurs from Cape Cod to Florida, but is much scarcer than the previous species.

Series Teleostei.

BONY OR TRUE FISHES.

Under the head of Teleosts comes the vast majority of modern fishes. The skeleton is ossified, the vertebræ are completely formed, the tail is not distinctly heterocercal in adults, it is in a few cases diphyccercal but generally homocercal. The

arterial bulb is thin and not contractile, and has a pair of opposite valves. The intestine is without a spiral valve. The optic nerves cross.

The proper division of the Teleosts into orders is still not a thoroughly settled question and I will not enter upon special descriptions of them.¹

Group Physostomi.

In this large group the air bladder is connected with the alimentary canal by a duct. The fins, with the exception of occasional strong spines in some families, are always soft-rayed.

Family Siluridae.

CATFISHES.

In this family the subopercle is wanting, the anterior vertebræ are grown together, the maxillary is rudimentary and forms the base of the largest barbel, the skin is naked or covered with plates; there are usually two dorsals, the first with a strong spine, the second adipose. Each pectoral also has a strong spine. The numerous teeth are in villiform bands. The air bladder is large, generally present, and connected with the auditory ossicles; it is sometimes partly surrounded by osseous plates.

¹*Explanation of abbreviations used in this paper.*

D.—Dorsal fin.

2d D.—Second Dorsal fin.

P.—Pectoral fins.

V.—Ventral fins.

A.—Anal fins.

C.—Caudal fin (tail).

Roman numerals used in connection with fins, mean spines or inarticulate rays.

Arabic numerals indicate soft rays. For example D. XI, 10 means one dorsal fin with 11 spines and 10 soft rays.

D. X-I, 32 means first dorsal fin with 10 spines, second dorsal fin with 1 spine and 32 soft rays. The dash between the numerals indicates that there are two fins.

Scales 6-42-12 means 6 scales counted vertically from the front of dorsal to the lateral line; 42 scales in the lateral line itself (if present) or along a side line from head to tail; and 12 scales vertically from the lateral line to the anus. When only one numeral is given, the number of scales along the side is meant.

Scutes are the tooth-like scales forming the saw-like margin of the belly in some fishes.

The Siluridæ compose a large and important family of mostly fresh water fishes. It is represented here by two genera and three species, all of which have teeth in the jaws only and possess eight barbels.

Ameiurus catus (L.).

WHITE CATFISH.

A. albidus LESUEUR. *A. niveiventris* COPE.

The white channel or "mud" catfish occurs in all the larger streams subject to the tide, and grows to a size of nearly two feet. The color on the upper parts is stone gray or bluish, underneath whitish, often with a delicate rosy tint, the lower fins sometimes tinged with red. The caudal is furcate. The anal has 20 or more rays.

This fish occurs along the Atlantic and Gulf Coast regions. It is frequently caught on set lines with liver or killy bait and bites best at night. The flesh is much better flavored than that of the next.

Ameiurus nebulosus (Les.).

COMMON CATFISH.

The common catfish, bullhead or pout is one of the most plentiful of fishes all over the eastern United States. It is of very variable color, from dark blackish and olive to brown and yellowish above, becoming lighter below, and often clouded on the sides. Those from tidal or running water are lighter colored than those from stagnant places or ponds. It is frequently found in boggy places with hardly enough water to cover it. The tail fin is unevenly truncate, the upper part a little longer than the lower; the adipose fin is free; the anal has about 21 rays. The pectoral spines are long, stout, and serrate behind for the greater part of their length. The species *A. melas* (Raf.) is very similar to this and perhaps will ultimately be classed with it.

The largest specimen of the catfish found by me in the near vicinity measured $13\frac{1}{2}$ inches in length and weighed one pound, two ounces; further inland they appear to grow to a length of 18 inches, and some seen by me were nearly of that length.

The catfish is very voracious and, though a carnivorous fish, will eat grains of farina, pellets of dough and maize mush. It is a rapid grower, and small specimens in captivity soon outgrow their desirability as aquarium fish. At the end of the third year this fish is perhaps fully matured. The ripe eggs are of the size of large pin heads and are of an orange color; the very young fishes look like little black toad tadpoles. The spines are strongly developed at an early age. The old fish accompanies the brood for a certain time, always swimming around the swarm of young in order to keep them together. When alarmed the parent dashes off, followed by the whole swarm.

***Schilbeodes gyrinus* (Mitch.).**

STONE CATFISH.

In the genus *Schilbeodes* the adipose fin is low and generally joined to the caudal fin; it comprises a number of small fishes. Our species is distinguished by its confluent adipose and caudal fins, giving the fish the appearance of having a sort of broad eel tail. It grows to a length of three and one-half or four inches. The general color is brownish, without blotches. Jordan in the "Manual" says that it has a black lateral streak, sometimes with two other streaks above this. I have found none with this feature; it is the lateral line itself which looks darker in color. The head is broad and deep, the anal fin has fifteen to sixteen rays. The pectoral spines are entire or grooved behind, never serrate.¹ When carelessly handled the fish will not be soon forgotten, as the sting from these spines hurts like a wasp's sting and sometimes results in a swelling of the finger lasting for a day or more; there appears to be a poison gland behind the pectoral, as in some foreign Siluroids.

The eyes are small, beadlike and at night glisten like adamant, indicating a more nocturnal habit. These fishes are called stone catfishes, but they prefer still, muddy water. I have obtained them from Greenwood and Wawayanda Lakes, and the Ramapo and Hackensack River valleys. In the

¹ D. S. Jordan. B. Synopsis of Siluridæ of the fresh waters of North America. Bulletin X, National Museum, 1877.

aquarium it is even more hardy than the common catfish and often lies on its side for hours as if dead, or remains suspended in the water in various odd positions. It does not much annoy other fishes with which it is kept. The stone catfishes are also known by the name of mad toms.

Family Catostomidae.

SUCKERS.

The suckers are quite closely related to the carps and minnows. The body is oblong, covered with cycloid scales; the maxillary is perfect. The anterior vertebræ are grown together; an auditory ossicle is present. The head is naked, the jaws are suctorial with a protractile mouth in most cases; lips thick, fleshy, often cleft into lobes. The teeth are in one to three series on the lower pharyngeal bone. The air bladder is divided into two or three parts by constriction. The tail is forked; the adipose fin absent. The alimentary canal long, without cæca.

Suckers prefer quiet waters and ascend into the smaller streams to spawn, often in immense numbers. It is then that they are mostly taken, either by netting or spearing, or even by hand, and then also (in early spring), their flesh is edible, at other times they are very soft. They feed by sucking up the mud and thus picking out small organisms and decaying matter. We have here about three genera with three or four species.

***Catostomus commersonii* (Lac.).**

WHITE SUCKER.

In the common white or brook sucker the air bladder is in two parts; the scales are small, increasing in size posteriorly. The small mouth is inferior, the under lip bilobed. Color brownish, olivaceous above, silvery below; the young are much blotched and marked on sides and back. D. twelve rays. Scale formula 10-64 to 70-9.

Found all over the eastern United States; common. It is occasionally caught on the hook. Young ones, in captivity, though they always grub about, and though they take food offered them, do not thrive and gradually starve. They remain wild and take alarm easily and often leap out of their

tank. This species enters slightly brackish water ; it grows to a length of eighteen inches.

Catostomus nigricans Les.

BLACK SUCKER.

The black sucker is also called by such names as hog molly, stone totter, etc. The scales are larger than in the previous one; there are about fifty on the lateral line. The back is brassy olive with dark cross blotches in younger specimens. The lower fins are red. Dorsal 11, anal 7. Length two feet. Abbott mentions it from South Jersey. I provisionally refer to this species some suckers from the upper Passaic, which I received some years ago, but, owing to insufficient data, am not positive as to the correctness of this. They may have been *Moxostoma macrolepidotum*.

Erimyzon sucetta (Lac.).

CHUB SUCKER.

Moxostoma oblongum Auct.

A rather common fish; broader than the brook sucker. Scales large, lips thin, no lateral line. Color dark, olivaceous above, more yellowish to silvery below; the young have a broad black band along the sides and one along the back. Dorsal 11 to 13. Scales 43-15. This fish bears captivity better than the other suckers and is somewhat livelier in its habits. I have seen it taken by snaring with a wire noose attached to a stick. It grows to a length of nine inches.

Moxostoma macrolepidotum Les.

RED HORSE, MULLET OR WHITE SUCKER.

A heavier fish than the ordinary sucker. The mouth is large, the lips thick; color olivaceous, brassy above, silvery on the sides, the lower fins and tail fin flesh red. Dorsal 12, anal 7. Scales 5-45-4, large. Air bladder in three parts. (See also *Catostomus nigricans* above.)

Family Cyprinidae.

MINNOWS AND CARPS.

One of the largest fresh water families; found in the Northern Hemisphere and in Africa. The American species are mostly small. The larger Cyprinoids of the Old World are

represented in America in a measure by the Catostomoids. The vertebræ of the anterior part of the body are grown together, the auditory ossicle is present. The head is naked; the body scaly, except in a few cases; the mouth is toothless, sometimes with barbels. The lower pharyngeal bones are well developed, scythe-shaped, with one to three series of teeth, few in number. No adipose fin. Air bladder large, generally in two parts, seldom absent; stomach simple without appendages.

During the breeding season the males of many of these fishes are much tuberculated and the fins, and often other parts of the body, are brightly colored, so that many of them at this season are scarcely rivaled in beauty by any other fishes.

***Hybognathus nuchalis* Ag.**

SILVERY MINNOW.

H. osmerinus COPE.

Slender; head short; lower jaw shorter than upper. Thirteen large scales in front of dorsal. D. 8, A. 7. Scales 5-38-4. Lateral line decurved. Silvery green, sides bright silvery with an underlying plumbeous shade; fins pale. Length four to nine inches. New Jersey, west and south. Abbott¹ mentions it from the Raritan near New Brunswick.

***Pimephales promelas* Raf.**

FAT-HEAD OR BLACK-HEADED MINNOW.

Body somewhat short and deep. The head is blunt, almost globular in adult males. About 27 scales in front of dorsal. Olivaceous, a black bar across middle of dorsal, a dark shade along caudal peduncle. In adult males the head is jet black with large tubercles on the snout. D. I, 7, A. 7. Lateral line imperfect or wanting. Scales 7-47-6. Length 2½ inches.

This species is found in New England and westwardly and southerly, and may therefore occur here.

¹ To avoid repeating foot notes, I will here say that all references to C. C. Abbott's writings are made to the following papers:

"Notes on some Fishes of the Delaware River," in report of the United States Fish Commissioner for 1875-1876, Pt. IV, 1878; "Appendix E" in the Geology of New Jersey, 1868, and "Cyprinidæ of Central New Jersey," in American Naturalist, Vol. 8, 1874.

The New Jersey Geological Report, Vol. II, 1890, cited before, gives literal quotations from some of these papers, in connection with descriptions of species.

Pimephales notatus Raf.

BLUNT-NOSED MINNOW.

A minnow closely allied to the last. The body is more elongate, the head longer. Scales before the dorsal about 23. Color olivaceous, little silvery, sides bluish, a dusky shade toward the base of the dorsal and a black blotch in front thereof, absent in the young. Head entirely black in spring males, with tubercles on the snout. Dorsal I, 8, A. 7. Scales 6-45-4. The lateral line present. Length, four inches. Quebec to Delaware, Miss. and Kansas. Abbott found it at New Brunswick, N. J.

The next genus, *Notropis*, is a very large one of over 100 species; it is found only in North America, east of the Rockies, and now includes several genera before held to be distinct. The species are difficult of identification on account of their intergrading and great similarity. It is thought to be a group of very recent origin in which stability of species has not yet been fully attained.¹ They are all small, but owing to their abundance are of great value as food for other fishes. Five species come under our notice.

Notropis bifrenata (Cope).*Hemitremia bifrenata* COPE.

Body slender, tail contracted, upper lip on level of lower part of pupil; jaws subequal, eye large, lateral line very short. Straw colored, with jet black band, bordered with orange on the snout. D. 8, A. 7. Scales 5-36-3. Length 2 inches.

Massachusetts to Maryland. Very common in the Delaware, according to Abbott.

Notropis hudsonius (Dewitt Clinton).

SPAWNEATER; "SMELT"; SHINER.

Body elongate, moderately compressed, head short, snout blunt, eye very large, mouth small, subinferior; lateral line slightly decurved. 12-18 scales before the dorsal, fins small. Pale olive, young always with a round black spot on base of

¹See D. S. Jordan in "Report of Explorations made during the summer and autumn of 1888 in the Alleghany Region of Virginia, North Carolina and Tennessee, and in Western Indiana, etc.," in Bulletin of the U. S. Fish Commission, No. 8, 1888.

caudal ; sometimes with a dark lateral band; fins plain. D. 8, A. 8. Scales 5-39-4. Length 10 inches.

North and east, south to Georgia. Seldom found in smaller streams. Abbott records it from central New Jersey.

Notropis procne (Cope).

Hypsilepsis procne COPE.

Body elongate, slender, back slightly elevated at dorsal fin; tail long; snout blunt; mouth inferior, small; lateral line complete; eye large, longitudinally oval; 13 scales in front of dorsal; caudal deeply furcate; olivaceous, a dark lateral band on sides overlaid with plumbeous; a blackish line along base of anal. D. I. 8, A. I, 7. Scales 5-32-3. Length scarcely more than two inches.

Western New York to Maryland.

This little fish is very plentiful in the small brooks directly running into tidewater. It appears to approach the sea more closely than any other minnow, though it is never found in brackish water. It delights in strong currents, but in captivity lives well in the aquarium, feeding voraciously. It is almost entirely carnivorous. The Palisade Ridge is probably the furthest limit of this species towards the east. It is met with in company of the suckers and the roach.

Notropis analostanus (Gir.).

SILVER FIN.

Body sub-elliptical, compressed in the adult; head short, not very blunt. Mouth small, oblique. Bluish silvery, scales dusky edged, a dark vertebral line, large dorsal blotch which is wanting in the young. A. 8. Scales 5-38-3. Length 4 inches.

Western New York to Virginia, west and south. Abbott mentions it from central New Jersey.

Notropis cornutus (Mitch.).

SHINER; DACE; RED FIN.

N. megalops RAF.

Body short, compressed, elongate in young; head heavy, snout blunt, mouth little oblique, lower jaw included; eyes moderate; lateral line decurved; scales deeper than long.

Steel blue, with golden streaks, silvery below, fins pale, a dark spot behind opercle; males tuberculate in spring with belly and lower fins rosy. Scales 6-41-3. D. 8, A. 9. Length up to 8 inches.

Common and abundant throughout the greater part of the United States, ranging into Canada. A species which likes running water and is rather delicate in the aquarium. It somewhat resembles the roach (*Abramis*). Often associates with the black-nosed dace.

Notropis amoenus *Abbott*.

Body elongate, compressed; eyes large; mouth large, oblique. Lateral line much decurved. D. 8, A. 10. Scales 6-39-3. Translucent green, sides silvery, with sometimes a faint plumbeous band ending in an obscure spot. Length $3\frac{3}{4}$ inches.

Clear streams east of the Alleghanies, from Raritan to Neuse. Perhaps a variety of *N. photogenis* (Cope). Abbott mentions it from near New Brunswick, N. J.

Rhinichthys cataractae *C. & V.*

LONG-NOSED DACE.

Body elongate, subterete; a barbel present, snout long, projecting beyond the mouth. Dusky olive, mottled; no distinct lateral band; dusky spot on opercle; male in spring with lips, cheeks and lower fins crimson. D. 8, A. 7. Scales 14-65-8. Length to 6 inches.

Northern United States in mountain streams. Not found by me. Occurs in New England and in the Delaware valley. Ayres¹ described it from Long Island as *Leuciscus nasutus*.

Rhinichthys atronasmus (*Mitch.*).

BLACK-NOSED DACE.

Body elongate; head large; barbel small, snout not much projecting beyond mouth; eye small. Dark olivaceous, mottled above, a black or brown lateral band, bordered on each side with paler. Males in spring, crimson on lateral band and lower fins, later changing to orange. D. 7, A. 7. Scales 4-63-8. Length 3 inches.

A very beautiful and active fish, found in the swiftest streams

¹W. O. Ayres, "Enumeration of the Fishes of Brookhaven, L. I., etc." in *Boston Journal of Natural History*, Vol. IV, 1844.

of the eastern United States, associated with darters, blobs and small minnows. In the aquarium it is more hardy than any other minnow and eats voraciously of animal food.

***Hybopsis kentuckiensis* (Raf.).**

HORNYHEAD; RIVER CHUB; JERKER.

Ceraticthys biguttatus KIRTL.

Robust; head large, blunt; a barbel; mouth large, little oblique; eye small. 18 scales before the dorsal. Bluish olive, with browner shades; a dark bar behind the opercle; fins pale orange, unspotted; young with a black spot on base of caudal. Males with tubercles on the head in spring. D. 8, A. 7. Scales 6-41-4. Length 10 inches.

Pennsylvania, west and south, according to Jordan's "Manual." I have found two specimens of a fish at two different points on the Passaic River, which I refer to this species. It appears to be a greedy fish; one that I caught had swallowed the bait and had to be cut open to remove the hook. The flesh appears very soft.

***Semotilus corporalis* (Mitch.).**

FALLFISH; WINDFISH; CHUB.

Semotilus rhotheus COPE.

Somewhat robust, fusiform; barbels small; bluish above, silvery below, fins plain. 22 scales before the dorsal. D. 8, A. 8. Scales 8-45-5. Length 18 inches.

Canada and eastern United States. The largest native carp fish east of the Rocky Mountains.

Of either this or the next species I have caught a few in a tidal creek at Secaucus, N. J., but I cannot tell now (from insufficient data), which one of them to positively class it with. It is said to be common in the Delaware River.

***Semotilus atromaculatus* (Mitch.).**

CREEK CHUB; HORNED DACE.

Semotilus corporalis AUCT.

More robust than the former. Head large and broad, barbel minute, not evident in the young; mouth large, lower jaw included; eye small; 30 scales before the dorsal. Dusky, somewhat silvery, a dark bar at shoulder, a black spot at front

base of dorsal. Young with dark lateral band ; D. 7, A. 8. Scales 10-54-7. Length to 12 inches.

Common throughout the eastern United States. Abbott mentions it.

***Abramis crysoleucas* (Mitch.).**

ROACH ; SHINER ; BREAM.

Body elongate, compressed, head short and low ; mouth oblique ; lateral line much decurved. Greenish and bluish above, sides silvery with golden reflections, fins yellowish. Breeding males often deep golden on flanks, the lower fins red. D. 8, A. 13. Scales 10-51-3. Length to 12 inches.

Common all over the United States east of the Rocky Mountains in all waters. Generally found associated with the common sunfish, killies and catfish in our vicinity. It is an active fish and lives well in the aquarium, becoming very familiar with its keeper. Owing to the small size of the gullet, the smaller individuals will at length starve unless their food is much comminuted. From its numbers the shiner is of great importance as food for larger fish. In appearance it is shad-like and perhaps is the most typical of our Cyprinidæ ; its nearest relatives are found in the Old World.

***Cyprinus carpio* L.**

CARP.

Both this and the next species are distinguished from our native species by having much longer dorsals and by their more bulky shapes. The carp has four barbels. D. 23, A. 8. Each of these fins is preceded by a strong spine, serrate behind. The color is olivaceous of different shades, with brownish reflections, lighter below. There are several varieties of this fish, that with normal scales, that with a few rows of very large scales (called mirror carp), and that with very few or no scales (called leather carp). The carp crosses with the goldfish, forming hybrids. Length 18 inches or more.

This fish, originally at home in East Asia, has now become cosmopolitan and with the gold fish may be considered as almost a domestic animal.

Opinions differ greatly as to its value as a food fish. In Europe it is highly prized, while with us it is frequently con-

sidered to be very poor. This may be due to ignorance of preparing it for the table; it is a fish which should be boiled or stewed and served with a wine sauce. The carp is a sluggish, bottom feeding fish, continually rooting about in the mud and making muddy the water of streams which before its advent ran clear. In captivity it is hardy and quick growing. It is one of the few fishes which can live in the foul water of the lower Passaic River.

Carassius auratus L.

GOLDFISH.

Body similar to the last, but deeper and shorter; no barbels; dorsal and anal each with a serrate spine. Color originally olivaceous with brassy lustre. The goldfish has been bred by the East Asiatics for ages back, so that now there are innumerable varieties both of form and color, which if left to themselves would soon be lost and the species revert to the original stock.

In many of our streams and ponds, the goldfish has run wild and hundreds of the olivaceous type will be secured to one of a red color. In the fauna of the moraine ponds and in quarry holes, the goldfish stands first.

It will breed in foul water where only catfish and dogfish can be found. As an article of food it is nearly valueless. The total length approximates one foot.

Family Clupeidae.

HERRINGS.

Body oblong, with generally large cycloid scales, head naked, no barbels; anterior vertebræ normal; no auditory ossicle. abdomen often sharp, serrate. Anal long, caudal forked. No lateral line. Teeth weak or wanting. Stomach with a blind sac; pyloric appendages numerous; air bladder simple. A large family, having but few freshwater species. From the economic standpoint one of the most important fish families and one exceedingly numerous in the individuals of the various species.

Pomolobus pseudoharengus Wilson.

ALEWIFE; BRANCH OR RIVER HERRING.

The body deep, compressed, shadlike; head short, mouth large, belly sharp, serrated; scales large. Color bluish, sides

silvery with faint streaks around spot behind the opercle. D. 16, A. 19. Scales 50. Abdominal scutes 21x14.

Occurs along the Atlantic coast; anadromous; is caught in gill nets, fykes, etc., in great abundance in the spring.

This fish dies almost immediately on removing it from the water; the blood vessels of the gills are very delicate and rupture when brought in contact with the atmosphere, so that the fish bleeds to death. Fresh from the water they appear like molten silver. The flesh is very palatable, and no doubt is often sold as shad by dealers. It is found land-locked occasionally.

***Pomolobus aestivalis* (Mitch.).**

GLUT OR SUMMER HERRING.

Weaker than the former, which it much resembles, it is more elongate, the fins are lower, the eyes smaller. Color darker above with faint streaks; dark spot behind opercles.

It runs with the alewife and continues a little later. In habits the two fish appear alike.

***Alosa sapidissima* Wilson.**

SHAD.

Body deep, compressed, mostly large, belly serrated and sharp. Bluish, sides silvery, a dark blotch behind opercle, often followed by three or four others in a row. D. 15, A. 21. Scales 60. Scutes 21x16.

Anadromous and found all along the Atlantic and Gulf sea board; one of the most valuable food fishes. It is often caught in company with the alewives. The shad has been an object of much distribution by the Fish Commission of the United States, and has been transplanted to the Pacific coast and to Europe.

***Brevoortia tyrannus* (Latrobe).**

MENHADEN; MOSSBUNKER.

Body compressed, quite deep, fins small; eyes small; bluish, silvery below, fins pale, a dark spot behind the opercle with often many smaller spots behind in several irregular series. D. 19, A. 19. Scales 60-80. Scutes 20x12.

The menhaden runs in large schools, and, though a marine fish, it sometimes enters the rivers for a short distance.

It is said to reach a length of eighteen inches. A fish of some importance for making oil and for manure and the natural food of many predatory fishes. It is not edible and decays quickly.

Family Argentinidae.

SMELTS.

Resembles the salmon family in many respects. Small fishes with an adipose fin and small scales. The stomach is a blind sac, the gullet and intestines opening closely together. Pyloric cæca few or wanting.

***Osmerus mordax* (Mitch.).**

SMELT; FROSTFISH.

Mouth large; teeth strong. Dorsal 10, A. 15. Scales about 68. Length to 12 inches. Greenish, paler on the sides with a silvery band. Very similar to the European species.

Found along the northern Atlantic coast; anadromous.

A delicate fish, plentiful around stream mouths and sometimes land-locked. The flesh has a sweet taste. Artificial hatching has much increased the supply of the smelt.

Family Salmonidae.

SALMONS.

Strongly built fishes of oblong shape with cycloid scales, the head naked; mouth often very large and generally well-toothed. An adipose fin, caudal forked, lateral line present. Stomach siphonal, pyloric cæca up to 200, rarely absent; air bladder large, simple. In many of them the lower jaw of the male during the breeding season becomes prolonged and hook-shaped and fits into the emarginate or perforate upper jaw.

An arctogæal family, mostly of the fresh water. The larger species are anadromous. The salmonids are, economically, one of the most important families and many species are becoming cosmopolitan by human interference.

***Salmo salar* L.**

ATLANTIC SALMON.

A powerful fish with the characteristic hook jaw in the breeding season. Brownish above, silvery on sides, with many scattered black cross-shaped spots on head, body and fins, often

with red patches on sides in the males. The young, with dark bars and red spots, are often called "parrs," and formerly were thought to be a distinct fish. After the first year they are called "smolts." D. 11, A. 9. Scales 23-120-21.

The salmon is anadromous and is found on both sides of the Atlantic Ocean. The land-locked form, *var. sebago* (Gir.), first found in Maine, has been successfully transplanted into many waters. Though the salmon was almost exterminated on our coast it has been re-established by the Fish Commission, and where the conditions are favorable, is on the increase. Of late years salmon are again caught in the Hudson River approaches.¹

***Salmo fario* L.**

BROWN OR BROOK TROUT.

This European fish has been introduced here by the Fish Commissions of both States. It is called, for no sufficient reason, "Von Behr" trout. D. 13 or 14. A. 11 or 12. Scales 120. Length to thirty inches. Olivaceous and brownish above, more silvery on sides, back and dorsal fin with many round dark spots, sides with crimson spots, lower fins often reddish.

***Salmo irideus* Gibb.).**

RAINBOW TROUT.

The caudal is deeply emarginate, body bluish above, dorsal and caudal with many black spots. A broad crimson band on the sides fading out above and below.

Introduced into the Eastern States and Europe from California.

D. 14, A. 14. Scales 140. It is doubtful whether any rainbow trout are to be found nearby.

***Oncorhynchus tshawytscha* (Walb.).**

COLUMBIA OR QUINNAT SALMON.

A large heavy fish; dusky above, head darker, silvery below with black dots. Males with elongated jaw in spawning time. D. 11, A. 16. Scales 150. Length three feet.

¹ See H. M. Smith.—Notes on the capture of Atlantic salmon at sea, etc., in Bull 14, United States Fish Commission for 1894.

This fish was introduced here years ago, but without any apparent success.¹

***Salvelinus fontinalis* (Mitch.).**

BROOK OR SPECKLED TROUT.

Head large, snout blunt, mouth very large, eye large, caudal not deeply cut. Dusky with darker blotches above, sides greenish, bluish and silvery below, belly reddish in males. Dorsal and caudal barred or vermiculated, lower fins dusky with red or orange, sides with small red spots. When found in brackish water they are more silvery and grow heavier. D. 10, A. 9. Scales 37-230-30. Size up to twenty inches.

Found in the northern United States and Canada and along the Alleghanies south to Georgia.

The young are much barred and not very like the adult in appearance, and were described as *Baione fontinalis* by DeKay. The range of this fish also has been much extended by man.

Family Poeciliidae.

KILLIFISHES.

Body oblong, depressed in front, compressed posteriorly ; no lateral line, head and body scaly ; mouth small, terminal, protractile, fully toothed. A single dorsal far back. Caudal truncate or rounded. Stomach siphonal, no pyloric cæca ; air bladder simple. The sexes mostly unlike, the males during the breeding season often brilliantly colored.

A large, mostly brackish water family of nearly universal distribution.

Small fishes which serve as food for others. With us commonly called "killies."²

The family is subdivided into carnivorous and limnophagous, but many of them are indiscriminate feeders.

***Cyprinodon variegatus* Lac.**

SHEEPSHEAD OR PURSY MINNOW.

Body short, compact. Male bluish, of a weak reddish tinge below ; caudal with black bar at base and tip ; female olivaceous, more silvery on sides with dark irregular cross streaks.

¹ See New Jersey State Geologist, Final Report, cited above.

² From the Dutch word "kill," meaning creek.

D. 10, A. 10. Scales 36-13. Length up to four inches. This fish does not enter streams to any great distance, preferring strongly brackish waters. It occurs along the entire Atlantic coast.

***Fundulus majalis* (Walb.).**

MAYFISH; MUMMICHOG.

Head long, scales large. Male olivaceous, brassy, with twelve bars of darker color; dorsal fin spot black, lower fins yellowish. Females paler with black lines on side and one or two bars at base of caudal. D. 12, A. 10. Length to six inches.

Atlantic coast. This species does not ascend rivers as far as the next. The female exceeds the male in size.

***Fundulus heteroclitus* L.**

COMMON KILLY; COBBLER.

Body short and robust. Male greenish, more yellowish below, with bluish and silvery bars; dorsal dark with large black spots; lower fins yellowish. In the breeding season often deep blue on back and sides. Females more silvery. D. 11, A. 10. Scales 35-12. Length two to five inches.

Atlantic and Gulf coasts; runs up stream further than the last species. Stands captivity well and is often found "land-locked" in ice or quarry ponds. The flesh has a sweet taste. This killy appears in countless numbers at times.

***Fundulus diaphanus* (Les.).**

TRANSPARENT OR FRESHWATER KILLY.

Body more slender and head more pointed than in the others. Sexes nearly alike. Olivaceous, sides silvery with many narrow dusky crossbars, fins plain or yellowish.

Northern and eastern United States to the Rocky Mountains, in all waters. This killy, though often found in the salt water inlets, nevertheless must be considered as a fresh water species.

In the aquarium it lives better than any of the others, excepting *F. heteroclitus*. All killies are extremely voracious and attack the fins of other fishes. They become very tame in captivity.

Lucania parva (*Bd. & Gir.*).

RAIN-WATER FISH.

Body deep; male dark olive, female lighter. Dorsal dusky orange with black spot at base, other fins lighter orange margined with black. The fins of the female are plain. D. 10-12, A. 10-11. Scales 26-8. Length two inches.

Along the coast from Long Island, southward; occasionally found nearly land-locked in ditches.

Family Umbridae.

MUD MINNOWS.

Body fusiform, head large, somewhat blunt, both scaled. Fins all soft-rayed, very mobile, caudal round, fan-shaped, pectorals and ventrals narrow. Mouth quite large, with villiform teeth. Stomach siphonal, no pyloric appendages, air bladder simple. There are only three species known, all closely allied but far apart in locality. Two are found in the eastern United States from Carolina to Ontario and west to Minnesota. The other is found in a limited area of Austro-Hungary. In habits they are alike, but our species appear to be hardier and less given to fungus growths than the European *U. crameri*.

Umbra pygmaea (*DeKay*).

MUD MINNOWS; DOGFISH; ALSO CALLED "ROCKFISH."

This species is of a generally olivaceous color with pale interrupted lines of cuneiform like figures, a dark caudal bar; lower jaw dark; some are much paler than others. D. 14, A. 9. Scales 35-15. Length $3\frac{1}{2}$ to 4 inches.

The dogfish is a most peculiar fish, as voracious as a pike and as tough-lived as a catfish. It requires only little water and can often be dug from the moist mud of ditches, the water of which has evaporated. None may be found in a stream, but the puddles and musk-rat holes alongside may be full of them. It is a good deal of an air breather, rising to the surface to gulp in air and then descending again, in the fashion of the paradise fish. In the aquarium it is very hardy and apt to annoy other species by driving them around and attacking their fins. When exposed to the air in freezing weather, it succumbs almost instantly, also when put into water containing much

lime; on the other hand, hot weather does not in the least trouble it, except that it gets its supply of air more frequently. In movement it is very erratic, now dashing about as if mad, again standing perfectly motionless in the water, only moving the pectorals and ventrals "like a dog, running," again only moving pectorals and the rear part of the dorsal or only the latter fin alone. It can turn its head sideways at an angle and remain a while in that position. When feeding it gorges the morsel at one attempt, after staring at it a while. Sometimes when overfed the dogfish cannot swim about at all, but lies like a log on the bottom.

Found in lowland streams east of the Alleghanies, from New York to Carolina.

Family Luciidae.

PIKES.

Body much elongate, little compressed; head flattened, snout much depressed, mouth very large, full of teeth, those on the lower jaw very strong and of unequal size. Dorsal and anal very far back, caudal roundly forked. Scales on cheeks and body; lateral line present. Intestinal canal simple. Air bladder simple; gill openings wide. Extremely voracious fishes, the sharks of the freshwaters. There are only five species known, all of the one genus *Lucius*. Four are exclusively North American, the fifth is arctogæal. They are considered among the gamiest of fishes and possess very edible flesh. Pike in the aquarium must be kept by themselves, owing to their rapacity; they are somewhat delicate in captivity.

Lucius americanus (Gmel.).

PICKEREL.

The large head is shorter than in the others. Olivaceous above with about 20 distinct, curved, loop-shaped, dusky bars; fins plain, reddish; a dark bar below the eye. D and A 11 or 12 rays each. Scales 105. Grows to a length of one foot.

Common east of the Alleghanies in coastwise streams. This species is here often met with in brackish water, and is then more brown in color.

Lucius reticulatus (Les.).**RETICULATED PICKEREL.**

Head and snout longer than in the former. Olivaceous with numerous darker lines and streaks, mostly horizontal, forming a rude net design; fins plain. D. 14, A. 13. Scales 125. Length to thirty inches.

Occurs within the same territory as the last, but further away from the coast.

Family Auguillidae.**TRUE EELS.**

Body much elongate, serpentine, "footless," *i. e.*, having no ventral fins; dorsal, caudal and anal generally continuous. The shoulder girdle is not connected to the skull. Stomach with a blind sac and no pyloric appendages. Scales small and on account of the thick mucous covering in many cases not readily seen, skin thick. Lateral line present. Head long, pointed; mouth large, the lower jaw the longest, teeth small. Sexes hard to distinguish.

Anguilla chrysypa Raf.**EEL.**

Brownish, greenish and grayish, lighter below. Vertical fins confluent, plain. Length to 40 inches.

Found in the whole Atlantic drainage system from Canada to Brazil; often land-locked in ponds into which it only entered by traveling overland, which is done at night or in wet weather. The propagation of the eel was a mystery until a few years ago; it is now known to be catadromous, *i. e.*, running down the rivers to the sea or at least into strongly brackish water to spawn. After this process the female is supposed to die. The young eels proceed upstream in innumerable array, overcoming all obstructions.

In captivity eels live for many years. They delight to lie buried in the mud or sand with only their heads out, ready for anything edible to come within reach. Mussels and snails are picked out of the shells by them.

Group Physoclisti.

The air bladder is closed, not connected by a duct with the

alimentary canal in the adult. Most of them have spines in some of the fins.

Family Esocidae.

NEEDLE FISHES.

Body compressed and oblong, a ridge along the side of belly; head scaly. Many teeth; dorsal far back; no spinous fins; intestinal canal simple; air bladder large. Marine fishes of which the following species is anadromous.

***Tylosurus marinus* (Walb.).**

BILL OR GARFISH; GREEN PIKE.

Body long; jaws slender. Color greenish, silvery on the sides; bones and scales green. Said to grow to a length of four feet. Scales 300.

Coastwise along the Atlantic shores. Abbott says they are often found in the Delaware and Raritan canal basins, when the water is drawn off in winter. I caught one specimen only of this fish some years ago in a brackish creek at Secaucus, N. J.

Family Gasterosteidae.

STICKLEBACK.

Small fishes with elongate compressed bodies; tail slender; skin naked or with bony plates; head large, teeth villiform, in jaws only. The whole appearance mackerel-like. Dorsal, ventrals and anals with large spines, which in the dorsal are isolated excepting the last. The greater number of species are nest builders, the male building the nest and defending the young against all intruders. They are mostly brackish water fishes of the colder waters and are considered to be very destructive to the spawn of other fishes.

***Pygosteus pungitius* (L.).**

NINE- OR TEN-SPINED STICKLEBACK.

Blackish or olive, blotched, barred or spotted, silvery beneath; tail keeled. Length 2 to 2½ inches. D. IX-I, 9, A I, 8.

North-east America. This species appears to run upstream further than the others. In the aquarium it often attacks fish and tears their fins into shreds. During the breeding season, the male becomes of a rosy hue beneath. It is a hardy

fish, enduring captivity better than the other species. Often found in pools in the woods, where seemingly no other fish occur.

***Gasterosteus bispinosus* Walb.**

COMMON TWO- OR THREE-SPINED STICKLEBACK.

Olivaceous with spots above, silvery beneath and on sides. Keel on side of tail. D II-I, 13; A. I, 8 or 9. Length 3 to 4 inches.

Exceedingly common in the tidal creeks in the spring. The nest of this fish is made on and in the sand with the aid of bits of straw, weeds, etc. After the female has deposited the eggs, the male stands over the nest and fans it with the pectorals, only leaving to get food, or to resent an intrusion; he often kills the female with whom he has paired. During this time the male is red below and bluish and greenish above, with indistinct darker bars. After the spawning season is over they seem to die off, at least they do in captivity. With proper attention the young can be raised to quite a size. This fish has been described under many different species and varieties, but all appear to be closely related. It does not enter very far inland.

***Apeltes quadracus* (Mitch.).**

FOUR-SPINED STICKLEBACK.

Olivaceous, mottled and marbled or finely dotted. Ventral spines and fins red a great part of the year in the male; body higher in front, tapering backward, skin naked. D. III, I, 11; A. I, 8. The dorsal spines usually diverge, three to one side and one to the other. Length 2 inches.

Runs upstream into purely freshwater and is commonly associated with the killies in small ditches and pools. This stickleback builds a rudimentary nest of plant bits and acts like the above in most respects; it is hardy and can be kept all the year around. I have successfully raised this fish to nearly mature growth.

Family Atherinidae.

SILVERSIDES.

Elongate fishes without lateral line, mouth moderate, teeth weak; dorsals far apart, the first of weak spines. Scales cycloid. Air bladder present. Brackish water fishes.

***Menidia notata* (Mitch.).**

SILVERSIDES; SPEARING.

Slender, transparent; greenish or straw color. D. IV-I, 8; A. I, 8. Length 3 inches or more.

Found coastwise, entering streams and often in nearly fresh water. The spearing swims in shoals and likes eddies close to swift currents. It is a very delicate little fish, which can be kept only in continually agitated water.

We have now reached the spiny rayed fishes proper, in all of which, if the ventral fins are present, they are thoracic or jugular, generally I, 5, the gills usually four, opercles and pharyngeals well developed and the premaxillary forming the whole border of the mouth. The first rays of dorsals and anals are usually spinous.

Family Pomatomidae.

BLUEFISHES.

These have a large, oblique, much toothed mouth; the caudal is forked; scales ctenoid. The only species of the family is

***Pomatomus saltatrix* (L.).**

BLUEFISH.

Blue above, silvery below. D. VIII-I, 25; A. II-I, 26. Spines weak. Scales 95. Length to 3 feet.

A fish occurring in tropical waters; on our coast north to Cape Cod. During the warm season they often run up the rivers, the young, called "snappers," frequently into nearly fresh waters.

The bluefish is a most destructive fish, tearing to pieces its own kind if any of them should become disabled. It follows the menhaden schools for prey.

Family Aphredoderidae.

PIRATE PERCHES.

Consists of only one species, widely distributed in the eastern United States in lowland streams. The body is oblong; head thick, depressed; tail compressed. Teeth in bands on jaws, vomer and palatines. Chin projecting; opercle with a spine;

no lateral line; dorsal small, no spines in ventrals, caudal rounded.

***Aphredoderus sayanus* (Gilliams).**

PIRATE PERCH.

Dark olive, dotted with black, two dusky bars at base of caudal. D. III, 11; A. II, 6; V, 7. Scales 48-58. Length 6 inches. A very predatory, nocturnal fish, found in sluggish, weed-grown streams. In South Jersey it is found, according to Abbott, north to Mercer County. The furthest east from which it is known appears to be Suffolk County on Long Island.¹ It may, therefore, be found nearerby.

Family Centrarchidae.

SUN-FISHES.²

This fresh water family is confined to North America, north of Mexico. The body is proportionally deep and compressed. The opercle with or without a flap, generally with a blackish spot. Lateral line present. Dorsal continuous. Teeth small, short. All sun-fishes are bold, voracious fishes. Some are "nest" builders.

***Pomoxis sparoides* (Lac.).**

CALICO, GRASS OR STRAWBERRY BASS.

Body oblong; snout projecting, opercular spot small. Silvery olive mottled with greenish, fins with paler spots; the soft dorsal large; anal large. D. VIII, 15; A. VI, 17. Scales 40 to 45. Length to 12 inches.

Eastern United States. The calico bass is not known to me from the vicinity and unless it has been introduced, I do not think it will be found. It originally occurred from the Hudson River westward and southward, but not in lowland streams.

***Ambloplites rupestris* (Raf.).**

ROCK BASS; RED OR GOGGLE EYE.

Body oblong, heavy; mouth large; opercular spot small. Color olive green, brassy, much mottled on sides with greenish or blackish; a dark spot below the eye. D. XI, 10; A. VI, 10. Scales 5-40-12. Length to 12 inches.

¹See Ayres, op. cit.

²See also C. H. Bollman. A review of the Centrarchidae in Report of U. S. Fish Comm'r. for 1888.

Eastern United States west of the Alleghanies. Introduced into Greenwood Lake, Passaic River and other waters. The young are pale or yellowish with dark bars, but do not appear to enter the smaller streams as much as the other sun-fishes.

***Acantharchus pomotis* (Bd.).**

MUD SUN-FISH.

Body oblong, mouth large. Color dark green or olive with three or more faint, dusky stripes on sides, cheeks with oblique bands, fins plain. Caudal convex. D. XI, 10; A. V, 10. Scales 6-42-12. Length 6 inches.

Atlantic coast streams. This fish I have found in the upper Hackensack valley. Baird collected it in South Jersey and in Rockland County, N. Y. Abbott mentions it from Mercer County, N. J. It perhaps may be found on Long Island. In habits it is shy and seclusive, a nocturnal fish.

***Enneacanthus obesus* (Bd.).**

SPOTTED-FIN SUN-FISH; ROCK SUN-FISH.

Body deep and short, opercular spot large. Olivaceous with 5 or more dark cross-bars, spots purplish, golden or pearly, dark bar below eye. Vertical fins large with light spots. Second dorsal and anal sometimes ruddy with black line edge. D. IX, 10; A. III, 10. Scales 4-32-10. Length $3\frac{1}{2}$ to 4 inches.

Coastwise from Massachusetts to Florida. First found by Baird¹ near Boston, Mass. Girard and Storer also mention it from Eastern Massachusetts. I have found no record from any other place in New England or from Long Island of this Carolinian species. In our vicinity it inhabits the entire Hackensack valley, preferring quiet, weedy places. For the aquarium it is the most desirable of all the sun-fishes, as well on account of its hardness as of its harmless nature.

***Lepomis auritus* (L.).**

LONG-EARED SUN-FISH; YELLOW BELLY.

Body somewhat elongate. Dorsal spines low. Opercular flap, small in young, very long and narrow in adult, black. Color olive with blue spots, lower spots and fins red or ruddy;

¹S. F. Baird, "List of Fishes from Beeseley's Point, N. J., and from Long Island, etc." in 9th Annual Report of Smithsonian Inst., 1855.

cheeks red and blue striped. Young more greenish. D. X, 10; A. III 9 or 10. Scales 38 to 48. Length 8 inches or more.

United States east of the Alleghanies to Louisiana. It does not go down stream as far as the next species. Very common in the Upper Passaic River and in the Great Swamp, also in the Bronx River. A very good aquarium fish.

***Eupomotis gibbosus* (L.).**

COMMON SUN-FISH; POND PERCH, BREAM, ETC.

Body deep, profile steep; sides greenish and bluish with orange spots and chainlike bars; cheeks orange red with blue stripes or streaks. Belly or lower fins orange. Opercular flap black, bordered with orange or red. Rear edges of vertical fins yellow bordered in the males, which are far brighter than the females, especially during breeding time. The females are more greenish and bluish, the opercular spot paler bordered. D. X, 11; A. III, 10. Scales 6-38 to 48-13. Length 8 inches or more. The male jealously watches his nest, which is a shallow dish excavated near the edge of the water in mud or sand.¹

In the aquarium the common sun-fish by incessant attacks often kills its associates of many kinds. It is a very gamey fish, common everywhere and is usually found in the company of shiners, minnows and killies.

Found in most of the morain ponds of Long and Staten Islands, and in the quarry ponds, etc., on the Palisades, put there frequently by boys. Provided there is water enough throughout the year, the sun-fish will thrive and multiply as freely as the gold-fish found with it.

This species ranges from Maine to Minnesota and east of the Alleghanies to Florida. Not in the Ohio basin.

***Micropterus dolomieu* (Lac.).**

SMALL-MOUTHED BLACK BASS.

Body more elongate, dorsal low. Olive green, lighter below with obscure bars. The young more brassy green and more

¹Compare also Thoreau, op. cit.

barred, cheeks with three oblique bars. D. X, 13; A. III, 10. Scales 10 or 11-72 to 75-17. Length to two feet.

Originally occurred in the eastern United States, excepting from Canada south to the Potomac, east of the Green and Alleghany Mountains. It has now been introduced generally, and also in Europe. Found in Greenwood Lake, Passaic River, etc. A bold, voracious fish, destructive of other species, and considered, next to the trout, as the "gamiest" of all fishes.

***Micropterus salmoides* (Lac.).**

LARGE-MOUTHED OR OSWEGO BASS.

Body more compressed and deeper than in the preceeding species. Mouth extremely large. Dorsals low. Dark green, silvery below with only indistinct traces of the blackish band, which is characteristic of the young. D. X, 13; A. III, 11. Scales 8-68-16. Length to 2½ feet.

Original distribution similar to that of the last, but now of wider occurrence. Found in most all of the nearby lakes and rivers.

The Oswego bass is even more destructive to fish than the other. It will eat any fish which it can manage to get into its mouth and will lie on the bottom for days so gorged that it cannot stir. In voracity it is only equaled, but hardly excelled by the pike. This bass bears captivity well.

Family Percidae.

PERCHES.

Body elongate, teeth usually villiform, sharp on the lower pharyngeals; scales ctenoid; opercle with a spine; fins large, dorsals separate; intestinal canal short; air bladder small or wanting. A widely distributed fresh water family. The genus *Etheostoma* of eastern North America embraces a large number of species and is considered of recent origin.¹ Many of the species grade into each other.

***Boleosoma nigrum olmstedii* (Storer).**

TESSELLATED DARTER.

Slender; fins high; spines weak; no scales on back in

¹See Jordan's "Manual." Also D. S. Jordan, in Bull. 8, U. S. Fish Commission for 1888, loc. cit., under *Notropis* above.

front of dorsals. D. IX-14; A. I, 9. Scales 4-50-7. Olivaceous with blotches and zig-zag markings on sides; fins with fine zig-zag lines. Length $3\frac{1}{2}$ inches.

Eastern United States, very common; often in tidal creeks, where the water is impure but not salty. In the aquarium they are delicate and can only be kept if the water remains at a low temperature and is not deep, unless in circulation.

***Etheostoma flabellare* Raf.**

FAN-TAILED DARTER.

Body long and low; head pointed, mouth with both jaws well developed. Dorsal spines in male with fleshy tips. Dusky olive with darker bars or streaks. D. and C. with zig-zag bars; caudal fan shaped. D. VIII-12; A. II, 8. Scales 7-50-7. Length $2\frac{1}{2}$ inches. Not altogether rare in Hackensack Valley streams, perhaps the easternmost locality where it is found. Jordan's "Manual" gives the distribution as Western New York to North Carolina and west. As an aquarium fish it is hardier than the others and feeds well.

***Etheostoma fusiforme* (Gir.).**

FUSIFORM DARTER.

Slender, terete; snout short, blunt; mouth small, oblique; eye large; caudal rounded. Olivaceous mottled with brownish, back and sides with green cross shades, sometimes red spots on the sides; spinous dorsal with red spots. D. IX or X-10; A. II, 6. Scales 50. Length 2 inches.

Abbott records it from Bound Brook, N. J., and as it occurs in New England it will very likely be found within our territory.

***Perca flavescens* (Mitch.).**

YELLOW PERCH.

Body oblong, somewhat compressed; back elevated. Pupil much oval. Dark olivaceous greenish; sides yellow with 6 or 8 dark bars from back down the sides, lower fins orange, upper dusky; the young with a black spot on rear part of spinous dorsal, paler in the adult. D. XIII-I, 14; A. II, 7. Scales 5-55-17. Length to 15 inches.

Canada and the northern and eastern United States, except the Ohio Valley. One of our common fishes. Feeds well in

captivity and does not molest its associates. The perch is more of a bottom feeder than the sun-fishes.

***Lucioperca vitrea* Mitch.**

WALL-EYED PIKE ; PIKE PERCH.

Body much elongate, pike-like ; head long. Dark olive, mottled with brassy, sides of head vermiculated. First dorsal with large black blotch behind ; other fins mottled, yellowish. D. XIII-I, 21 ; A. II, 12. Scales 90. Length to three feet. Northern and central United States.

Introduced last year into Greenwood Lake and Raritan River by the New Jersey Fish Commission. It occurs in the Great Lakes and west of the Alleghanies.

Family Serranidae.

SEA BASSES.

Body oblong ; mouth large, teeth mostly villiform, very numerous. Opercle with flat points, a lateral line. Tail stout, not deeply cut. Intestine short, stomach blind sac with pyloric appendages. A large and chiefly marine family of nearly universal distribution which furnishes many important food fishes. It is closely allied to the perches and sun-fishes.¹

***Roccus lineatus* (Bloch).**

STRIPED BASS OR ROCK FISH.

Body somewhat elongate ; spines slender ; mouth large ; dorsals separate. Olivaceous, silvery on the sides with 7-9 narrow dark stripes. D IX, I, 12 ; A. III, 11. Scales 65, Length 4 to 5 feet.

Entire eastern United States seaboard to Louisiana. This species is anadromous and is often found in pure fresh water ; also has been confined in ponds with good results. A predatory fish which in the brackish water replaces the black basses of the inland in respect to voracity and gaminess. Will live well in the marine aquarium, but much prefers agitated water.

***Roccus chrysops* Raf.**

WHITE OR SILVER BASS.

Back arched. Color greenish above, silvery below, with

¹See Jordan and Eigenmann, "A Review of the Serranidae, etc., in Bull. 8, U. S. F. C. for 1888.

dusky stripes on the sides. D. IX-I, 14; A. III, 9. Scales 55. Length 15 inches.

Canada and northern United States. The silver bass may owe its origin to land-locked striped bass. This fish, too, has been planted into Greenwood Lake by the New Jersey Fish Commission. It has been introduced abroad.

***Morone americana* (Gmelin).**

WHITE PERCH.

Body oblong, head pointed, back elevated. Spines strong. Mouth moderate. Olivaceous bluish, sides silvery, with faint lines, chin violet when removed from the water. D. IX-1, 12; A. III, 9. Scales 50. Length to 10 inches.

Atlantic coast north of South Carolina. The white perch is distinctly a brackish water fish, found all the year around, and runs up into perfectly fresh water; it can be land-locked with good results. In the tidal parts of streams, this perch is about the most common fish. They go in large schools and play about one spot for a long time; an angler meeting with such a swarm may catch a hundred or more within an hour, often, three at a time. I have on several occasions found a long green, brackish water (*Enteromorpha*) alga in their stomachs, indicating that they sometimes eat vegetable matter, though perhaps only for the minute organisms found upon it. A good aquarium fish in slightly salt water.

Family Sciaenidae.

CROAKERS; DRUMS.

Body elongate, compressed; skull cavernous with wide muciform channels. Teeth in villiform bands, none on palate. Lateral line continuous, sometimes extending over the caudal fin. The air bladder is large with many, often curiously shaped appendages or lobes, which structure seems to enable these fishes to emit grunting or croaking sounds. Ear bones large. Dorsal deeply notched. A large and widely distributed family, marine with few exceptions.

***Leiostomus xanthurus* Lac.**

SPOT; GOODY; LAFAYETTE.

Profile convex, body robust, compressed. Bluish or violet, sides silvery with many oblique dark bars, a dark ocellum be-

hind operculum. D. X-I, 32; A. II, 12. Scales 60. Length 12 inches.

Eastern coast of the United States; anadromous; often associated with the white perch. A very solidly built fish, powerful for its size.

Family Cottidae.

SCULPINS.

Body elongate, tapering to the rear. Head broad and depressed, sometimes armed with spines. Eyes high and closely placed; preopercles armed with spines. Teeth feeble, in villiform bands; body naked or irregularly scaled, or warty; anals spineless; pectorals large; ventrals thoracic; dorsals generally separate. A large and mostly marine family of wide distribution. In their movements they are sudden and jerky. Our fresh water Cottids are greatly alike.

Cottus gracilis (Heckel.)

STAR GAZER; BLOB.

Body slender; head broad; fins large; mouth large; preopercular spine short and bent upwards. Olivaceous, blotched and mottled, top of first dorsal red-edged. D. VIII-16; V. I, 3; A. 12. Length $3\frac{1}{2}$ to 4 inches. Somewhat darterlike in appearance, voracious, delights in strong currents.

Found in the northeastern States. It is very plentiful in the head streams of the Hackensack and Saddle Rivers in New York and New Jersey, in company with black-nosed dace and darters.

Family Gadidae.

COD-FISHES.

Body elongate; mouth large. Scales small, cycloid; vertical fins separate, dorsals one to three, anals one or two. No spines in fins. Tail isocercal. Air bladder present. Sometimes a barbel. A large family, marine with few exceptions and mostly of boreal distribution. With the herrings, the most important fish family in our economy.

Microgadus tomcod (Walb.).

TOMCOD; FROST FISH.

Snout rounded, with a small barbel; three dorsals and two

anals. Olive brown, blotched on body and fins with darker, punctulate on sides. D. 13-17-18; A. 20-17. Length 12 inches.

A diminutive cod-fish, common all along the shore as far south as Virginia. Runs up stream into nearly pure fresh water.

Family Pleuronectidae.

FLOUNDERS.

The flat-fishes are related to the cod-fishes; the skull is unsymmetrical, twisted about bringing both eyes to the upper side; the lower side is colorless. In early youth the flounders swim vertically and are normal of figure, but they gradually assume a horizontal one-sided position and shape. No air bladder; dorsal and anal very long, no spines. A large and widely distributed family of marine fishes of some importance. A few are anadromous.

***Achirus fasciatus* Lac.**

SOLE; HOGCHOKER, ETC.

Oval; teeth on the blind side only. The right side uppermost. Olive brown, mottled, with narrow black vertical lines, left side white with dark spots. D. 50 or more; A. 40 more or less. Scales 66-75. Caudal rounded; pectorals wanting. Length to 8 inches.

Entire Atlantic and Gulf coasts of the United States on sandy or muddy bottoms; anadromous. I caught one very small specimen of the sole in a tidal creek of the Hackensack River, where the water was fresh. It is thought that soles spawn in fresh water.

The total number of species of our vicinity, as above described, may be summarized as follows:

Native fresh water species known, 24; introduced species, 11; brackish water and anadromous species, 26. Total, 61. Adding thereto the probably occurring native species, 12, gives a total of about 73, belonging to 54 genera and 24 families. This shows that while the number of species is not large, the families are well represented.

None of the species are limited to a small area of nearby country. Fishes found by me further east than their supposed

range, as far as I am able to learn are: *Notropis procne* (Cope), said by Jordan¹ to range from western New York to Maryland; reaches east as far as the Palisades on the Hudson. *Etheostoma flabellare* Raf., also reaches to Hudson River, though Jordan gives its distribution as from western New York to North Carolina and westwardly. Further investigation is needed to confirm my identification of *Hybopsis kentuckiensis* (Raf.), and of *Moxostoma macrolepidotum* Les. as correct, both of which would then also range further east than is now known. The fresh water species of New England² and of the Maritime Provinces as far as the Gulf of St. Lawrence,³ are nearly all found with us, the exceptions being mostly the absence here of the more northern Salmonoids. Our vicinity represents a sort of borderland between the very restricted fish fauna of the New England "Zoological Island," as Agassiz called it, and the far richer fauna encountered in the Delaware basin immediately to the west of us.⁴ In common with the more southerly States, we have a few fishes which properly belong to the eastern Carolinian fauna; these are:

Enneacanthus obesus Bd., which, though found in eastern Massachusetts, appears to be a southern intruder and may occur on Long Island, judging from the appearance there of *Aphredoderus sayannis* (Gill); lastly *Acantharchus pomotis* (Bd.) belongs to the same category. These three species are distinctively lowland fishes of wide distribution along the seaboard to the south. The first reaches Florida, the second Louisiana, and the third Carolina. In regard to this I will refer to a conclusion reached by Prof. Jordan⁵ that these fishes represent the remains of a fresh water fauna, now nearly extinguished by the encroachment of the ocean upon the former shore line of the continent.

¹"Manual," cited above.

²D. H. Storer, "A History of the Fishes of Massachusetts, 1867. W. C. Kendall, "Notes on the Fresh Water Fishes of Washington Co., Maine," in Bull. 14, U. S. F. C. for 1894.

³Theo. N. Gill, "Fishes of the St. Lawrence Gulf and Bay of Fundy," in *Canadian Naturalist*, August, 1865.

⁴Abbott, op. cit.

⁵In "Fishes of the Alleghany Region, etc.," in Bull. 8, U. S. F. C., cited above.

Of the introduced species, three, the carp, the gold-fish and the brown trout are of Eurasian origin. The quinnat salmon, from the Pacific coast, seems not to have become established here. The other introduced fishes are all from nearby Atlantic and Great Lake States.

To make a final comparison of the number of fishes in other river systems or larger areas with the number found in our circumscribed territory, we find in the Connecticut River only 18 permanent species. Including all the anadromous and brackish water fishes, 25 species occur in the easternmost county of Maine. From the Neuse River in North Carolina, 55 species are known, while Cayuga Lake basin harbors 60.

As we go west into the Mississippi valley the number of species vastly increases, even the smaller tributaries having upwards of 50 species within limited areas, while from the Wabash River 130 species are recorded.

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1897-98.

No. 10.

ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK

For the Year Ending March 8, 1898.

WITH
THE FROGS AND TOADS FOUND IN THE
VICINITY OF NEW YORK
CITY.

By WILLIAM L. SHERWOOD.

The Society meets on the second and fourth Tuesday evenings of each month at the American Museum of Natural History, 77th Street and 8th Avenue, New York City.

PUBLICATIONS OF The Linnæan Society of New York. TRANSACTIONS.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPICE--PORTRAIT OF LINNÆUS. THE VERTEBRATES OF THE ADIRONDACK REGION, NORTH-EASTERN NEW YORK. By CLINTON HART MERRIAM, M. D.

General introduction. Mammalia: Carnivora. Biographies of the Panther, Canada Lynx, Wild Cat, Wolf, Fox, Fisher, Marten, Least Weasel, Ermine, Mink, Skunk, Otter, Raccoon, Black Bear, and Harbor Seal.

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Contains Biographies of the Deer, Moose and Elk; of the Moles and Shrews (six species); the Bats (five species); the Squirrels (six species); the Woodchuck, the Beaver, the Porcupine, the House and Field Rats and Mice (seven species), and the Hares (three species).

DESCRIPTION OF A NEW GENUS AND SPECIES OF THE SORICIDÆ. (*Atophyrax bendirii*, with a plate.) New York, August, 1884. By CLINTON HART MERRIAM, M. D.

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ABSTRACT OF PROCEEDINGS.

ABSTRACT OF PROCEEDINGS OF THE LINNÆAN SOCIETY OF NEW YORK.

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ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK
FOR THE YEAR ENDING MARCH 8, 1898.

This is the tenth in the series of "Abstracts" published by the Linnæan Society of New York, and like the preceding issues, is prepared mainly as a brief review of the work of the Society during the year closing with the date indicated above. When papers have been elsewhere printed, the customary reference is given.

March 11, 1897.—Public lecture in the lecture hall of the American Museum of Natural History by J. L. Wortman, M. D., entitled "Life in the Nacimiento Desert of New Mexico," with stereopticon illustrations.

March 23, 1897.—The Vice-President in the chair. Five members and thirteen visitors present.

Miss Grace B. Beach was elected a Resident Member of the Society.

Mr. Eugene Smith presented the second part of his paper on "The Fishes of the Fresh and Brackish Waters in the Vicinity of New York City." [See Abs. Proc. Linn. Soc., No. 9, 1897, pp. 9-51.]

April 13, 1897.—The Vice-President in the chair. Eight members and eight visitors present.

Mr. L. S. Foster was appointed Secretary pro tem. by the chair, to serve during the extended absence of the Secretary.

Mr. William L. Sherwood presented a paper entitled "The Frogs and Toads found in the Vicinity of New York City." [Printed at the end of this abstract.]

April 27, 1897.—The Vice-President in the chair. Five members and sixteen visitors present.

A resolution was passed favoring the placing of specimens of natural history on the same schedule in the mails of the International Postal Union as samples of merchandise. The Secretary pro tem. was instructed to forward a copy of the same to the U. S. Postmaster General and to the Chairman of the International Postal Convention of 1897.

Mr. Thomas Proctor presented a paper entitled "The Nightingale and the Mockingbird, the Chief Songsters of the Old World and the New, respectively." He exhibited living specimens of two species of Nightingales (*Dolius luscini* and *D. philomela*), Brown Thrasher (*Harporhynchus rufus*), Catbird (*Galeoscoptes carolinensis*), Robin Redbreast (*Erithacus rubecula*), and White-throated Warbler (*Sylvia rufa*).

May 11, 1897.—The President in the chair. Ten members and eighteen visitors present.

Messrs. M. H. Beers, John I. D. Bristol, Charles Butler, Francis M. Harris, William C. Harris, Walter M. Jones and Charles P. Kreizer, M. D., were elected Resident Members of the Society.

Mr. William T. Hornaday presented a paper on "The London Zoological Society and its Gardens." [See Second Annual Report, N. Y. Zool. Soc., 1898, pp. 43-67.]

Mr. L. S. Foster reported on sixteen species of our common birds observed May 9, 1897, during a trip to Hackensack, N. J.

Mr. F. M. Chapman stated that on his return from his recent trip to Mexico he saw between Tampico and Havana a Small-billed Water Thrush (*Seiurus noveboracensis*). Three Carolina Doves (*Zenaidura macroura*), accompanied the ship for some time. Shearwaters, especially Audubon's Shearwater (*Puffinus auduboni*), were seen near the Bahamas. Red Phalaropes (*Crymophilus fulicarius*), Northern Phalaropes (*Phalaropus lobatus*), Petrels and fifty Loons came under his observation off the Delaware coast. Mr. Chapman arrived in New York May 10.

May 25, 1898.—The President in the chair. Ten members and ten visitors present.

The following sixteen gentlemen were elected Resident Members of the Society: Messrs. Gerard Beekman, August Belmont, M. Langdon Bird, Frank S. Bond, Charles C. Clarke, James M. Constable, Charles Dieterich, R. G. Dun, Robert Dunlap, A. E. Haynes, E. R. Holden, Theodore D. Howell, William Kevan, William T. Lusk, M. D., J. Hampden Robb and Rev. Cornelius B. Smith.

Mr. Frank M. Chapman presented a paper entitled "Notes on Birds observed in Mexico." (See Bull. Am. Mus. Nat. Hist., Vol. X, 1898, pp. 15-43.)

October 12, 1897.—The President in the chair. Eleven members and ten visitors present.

The Secretary reported the receipt of a letter from the Bureau International de l'Union Postale Universelle, which stated that specimens of natural history would be received in the mails of the International Postal Union at the same rate as samples of merchandise after January 1, 1898.

Mr. F. M. Chapman presented a paper entitled "The Mammals Found Within Fifty Miles of New York City."

Mr. E. B. Southwick said that he had two specimens of the Hoary Bat (*Atalapha cinerea*), taken in Central Park, New York City.

Mr. William Dutcher remarked upon the large number of Opossums (*Didelphis virginiana*) at present on Long Island, N. Y.

Mr. Ernest Ingersoll had repeatedly observed Gray Squirrels (*Sciurus carolinensis leucotis*) dig up buried acorns after a snow-fall of eighteen inches.

October 26, 1897.—The President in the chair. Ten members and twelve visitors present.

Messrs. J. Camoreau Hatié, Ernest Ingersoll, John A. King, William P. Lemmon and Rev. Haslett McKim were elected Resident Members of the Society.

Dr. J. A. Allen presented a paper entitled "The Origin of the Migration of Birds." [See *The Auk*, Vol. XV., Jan. 1898, pp. 67-70.]

Adjourned to November 23, thus omitting the first meeting in November on account of the meetings during that week of

the American Ornithologists' Union at the American Museum of Natural History.

November 23, 1897.—The President in the chair. Ten members and eleven visitors present.

Mr. J. Chr. G. Hüpfel was elected a Resident Member of the Society.

An appropriation was made for the usual winter course of public lectures.

Mr. Ernest Ingersoll presented an essay on "Birds' Eggs," from an evolutionist's point of view. [See *Harper's Monthly Magazine*, December 1897, p. 7.]

December 14, 1897.—The President in the chair. Seven members and five visitors present.

Mrs. Mabel Osgood Wright was elected a Resident Member of the Society.

The Chairman of the Lecture Committee reported the following dates and lectures for the fifth annual course :

1. January 6, 1898. "Cats, and the Lands They Inhabit." By Daniel Giraud Elliot, F. R. S. E.

2. February 3, 1898. "From Vera Cruz to Mexico City." By Mr. Frank M. Chapman.

3. March 17, 1898. "The Mammals of North America." By Mr. Ernest Seton Thompson.

4. April 7, 1898. "Protective and Directive Coloration of Animals." By C. Hart Merriam, M. D.

The Society appropriated the sum of twenty-five dollars to be presented to the Audubon Society of the State of New York, for use in the general work of the organization.

Mr. Ernest Seton Thompson presented a paper on "The Mammals of Yellowstone National Park." Mr. Thompson's observations were made during the summer of 1897, and embraced about thirty species of mammals. [See *Recreation*, Vol. VIII, May 1898, pp. 365-371.]

December 28, 1897.—The President in the chair. Twelve members and fifty-three visitors present.

Mr. Thomas H. Hubbard was elected a Resident Member of the Society.

Mr. William Dutcher presented to the Society, for conveyance to the Local Collection of Birdskins in the American Museum of Natural History, four skins of the Pine Siskin (*Spinus pinus*), two skins of the Grasshopper Sparrow (*Ammodramus savannarum passerinus*), two skins of the Sharp-tailed Sparrow (*Ammodramus caudacutus*), two skins of the Bobolink (*Dolichonyx oryzivorus*), and one skin of the Scarlet Tanager (*Piranga erythromelas*).

Mr. F. M. Chapman showed upon the screen over eighty lantern-slides from photographs of birds in life, with descriptive remarks.

January 6, 1898.—Public lecture in the lecture hall of the American Museum of Natural History by Daniel Giraud Elliot, F. R. S. E., entitled "Cats, and the Lands They Inhabit," with stereopticon illustrations.

January 11, 1898.—The President in the chair. Ten members and seven visitors present.

Mr. Ernest Seton Thompson presented a paper on "The Summer Birds of Yellowstone National Park." Mr. Thompson, being unable, owing to the Park regulations, to collect specimens, recorded but sixty-five species. He gave interesting notes concerning these, especially the Gulls, Terns and White Pelicans, which breed in great numbers on islands in Yellowstone Lake.

Mr. Thompson also spoke of the habits and distribution of the Gray Wolf (*Canis lupus griseoalbus*).

Mr. Ernest Ingersoll presented evidence concerning the abundance of Badgers (*Taxidea americana*) in the State of Minnesota.

January 25, 1898.—The President in the chair. Six members and thirteen visitors present.

Mr. W. K. Parmelee presented a paper entitled "Notes on the Habits of Turtles, with Special Reference to Those Species Found within Fifty Miles of New York City."

A letter from Mr. John H. Sage of Portland, Conn., was read, stating that Goshawks (*Accipiter atricapillus*) were fairly common in that vicinity this winter.

February 3, 1898.—Public lecture in the lecture hall of the

American Museum of Natural History by Mr. Frank M. Chapman, entitled "From Vera Cruz to Mexico City," with stereopticon illustrations.

February 8, 1898.—The President in the chair. Ten members and eight visitors present.

Mr. William Dutcher presented to the Society, for conveyance to the Local Collection of Birdskins in the American Museum of Natural History, one skin of the King Eider (*Somateria spectabilis*).

Mr. William Dutcher read a paper entitled "Some Birds of the Thousand Islands, St. Lawrence River, N. Y." His observations were made between May 29 and June 14, and on July 23 and 24, 1897, and about fifty species were recorded and many interesting facts concerning their breeding habits noted.

Mr. L. S. Foster presented "Remarks on the Measurements of Some of the Common Hawks," illustrated by sections of cardboard, giving length, extent, and wing and tail measurements.

Mr. H. W. Congdon recorded the capture of an Olive-sided Flycatcher (*Contopus borealis*) in Sullivan county, New York, in the summer of 1897.

February 22, 1898.—The Vice-President in the chair. Seven members and eight visitors present.

Mr. William T. Price was elected a Resident Member of the Society.

Mr. R. L. Ditmars presented a paper entitled "The Growth and Transformation of Reptiles and Batrachians," illustrated by many beautiful specimens in formaldehyde.

Dr. G. Langmann spoke of the checking of the transformation in salamanders by allowing them no opportunity of leaving the water at the time the change would naturally occur.

Mr. A. H. Helme reported having seen a Catbird (*Galeoscoptes carolinensis*) at Millers Place, Long Island, N. Y., in December, 1897.

March 8, 1898.—Annual meeting. The Vice-President in the chair. Nine members and five visitors present.

Messrs. Eli W. Blake and Walter A. Johnson were elected Resident Members of the Society.

The Secretary presented his annual report, as follows :

" There have been held during the past year fifteen meetings of the Society, being one more than was held last year. The first meeting in November was omitted on account of the meeting of the American Ornithologists' Union, held in this city.

The total number of persons present at all meetings of the Society during the year was 322. Although the average number of members present at the meetings is the same as last year, 9, that of the visitors has more than doubled, being 13, as against 6 for the previous year. The largest number of members present at any one meeting has been 12, and of visitors 53. There has been no failure to secure a quorum.

" Thirty-three Resident Members have been elected, 2 have resigned, and the following have been lost by death: Frank Abbott, M. D., and Messrs. Charles Butler, Theodore D. Howell and William T. Lusk, M. D. The membership of the Society at present is, Resident, 163; Corresponding, 35; Honorary, 2—a total of 200.

" There have been presented at the meetings of the Society eighteen papers on the following subjects: Eight on ornithology, three on mammalogy, four on herpetology, one on ichthyology, one on oölogy, and one on the London Zoological Society Gardens.

" The Society has issued ' Abstract of Proceedings No. 9,' to which were added ' The Fishes of the Fresh and Brackish Waters in the Vicinity of New York City,' by Mr. Eugene Smith, and an index, the whole forming a pamphlet of fifty-six pages. One copy has been given to each member and the usual exchanges made."

The Librarian presented his annual report as follows :

" The Library of the Society has been increased by about 150 publications. The volumes have been rearranged, but no further work towards completing the catalogue has been done."

The Treasurer presented his annual report, showing a balance on hand of \$307.80.

The following officers were elected for the ensuing year :

President, Mr. Frank M. Chapman.

Vice-President, Jonathan Dwight, Jr., M. D.

Secretary, Mr. Walter W. Granger.

Treasurer, Mr. L. S. Foster.

Dr. J. A. Allen presented a paper on "The Red Squirrels of North America." [See Bull. Am. Mus. Nat. Hist., Vol. X, 1898, pp. 249-298.]

The Frogs and Toads Found in the Vicinity of New York City.

BY WILLIAM L. SHERWOOD.

To describe a class of animals and to collate such information as is of general interest, one finds it necessary to refer to text books and difficult to avoid using the terms there employed. Some of the descriptions in the following paper will be found to be couched in language taken from such sources, with additions suggested by personal observation. Rather than frequently quote short clauses or single adjectives, the writer prefers to state at the beginning that he is indebted to Professor Cope's "Batrachia of North America" for many parts of descriptions, which could not be expressed in better language than that found in the book mentioned.

The batrachians¹ differ from all other vertebrates in having both gills and lungs, the former persisting throughout life in some of the tailed forms, as the sirens and mud-puppies of the United States and the *Proteus* of Europe. After leaving the egg there is a more or less prolonged gill-bearing period.²

This is accompanied by a metamorphosis which involves changes from a fish-like form, without limbs or functional lungs, to an adult with four limbs and with lungs. The batrachians share with the reptiles in having cold blood, owing to it not being fully oxygenated as in the birds and mammals. The heart has three cavities, two auricles and a ventricle. The venous blood enters the right auricle from a cavity called the *sinus venosus* and passes into the ventricle, where it is mixed with aërated blood from the left auricle, which in turn has received this from the lungs. The mixed blood passes from the ventricle through a bulbous cavity known as the *truncus arteriosus*, from which it is propelled in part to the lungs for further

¹ *Batrachos*, frog.

² *Salamandra atra* of Europe forms an exception, the young being brought forth fully formed, although possessing gills in the mother.

aëration, and in part, in its mixed condition, to the aorta and arteries of the body. In the birds and mammals the blood is fully oxygenated through the functional activity of a fourth cavity of the heart, and is therefore warm.

The batrachians were the first air-breathing vertebrates. The fishes and other low forms breathe oxygen existing free in the water, instead of atmospheric air. Many modern anatomists use the term amphibia for the batrachia, but the latter name was first properly used by Brongniart to define a correctly limited group and is retained.

The batrachians are divided into three groups, one of which embraces extinct forms more nearly related to the fishes than to either of the others. The second division includes the salamanders (*Cæcilia* and *Urodela*) and the third the frogs and toads. To this is given the name *Salientia*.¹ This division is the most specialized and the farthest away from the type.

The Salientia are separated from other batrachia by diversities in anatomical and skeletal structure, especially in the loss and coösisfication of various parts of the skeleton. In common with *Urodela* (salamanders) they have a naked skin, four limbs, three cavities in the heart and lungs, while the latter receive oxygen, active elimination of carbon dioxide takes place through the skin.² They differ noticeably from salamanders in having no ribs, no tail in the adult, and in the ankylosis of the radius and ulna and tibia and fibula.

¹ Latin, *Salio* (ppr.), *salien(t)-s*, leap.

² It has recently been discovered that several of our adult salamanders lack lungs and gills, and that the respiratory function is carried on by other structures or organs. Professor Harris H. Wilder of Smith College, has described this peculiar condition and arrived at the conclusion that respiration was probably carried on by the skin and perhaps to some extent by the mucosa of the intestine.

In a paper read by G. S. Hopkins, of Cornell University, before the American Association for the Advancement of Science, August 24, 1896, attention is called to the rich supply of blood-vessels of the skin, which are so close to the surface as to admit of ready interchange of the gases of the blood and air. Mr. Hopkins says that it is often possible to distinguish between salamanders with and without lungs by examination of the heart alone. In the lungless forms examined the left auricle is very small and *no pulmonary vein was found opening into it*. The *sinus venosus*, instead of opening into the right auricle only, opens more freely into the left auricle than into the right. Mr. Hopkins examined eight

The foetus has no embryonic sac (amnion) and the allantois (organ by which foetal blood is aerated in the higher animals) is absent.³

The skeleton is internal. The vertebræ of our frogs and toads are procœlous (concave in front only). There are nine of these and a peculiar bone, the urostyle, which articulates with the sacrum. The skull articulates with the first vertebra or atlas by two occipital condyles, and the nasal sacs open posteriorly into the pharynx. The reproductive, urinary and digestive organs open into a common receptacle, the cloaca.

Our Salientia are divided into two sub-orders, the *Arcifera* (toads and tree-frogs), in which the opposite halves of the scapular arch are connected by an overlapping arched cartilage (the shoulder girdle), so that the thorax may contract or expand; and the *Firmisternia* (frogs), in which the opposite halves are connected by a single median cartilage and are incapable of movement. In the tadpoles of the latter division the shoulder girdle is movable (arciferous), but becomes consolidated upon maturity.

The family divisions are based principally upon the presence or absence of teeth and their arrangement and the shape of the sacral diapophyses, and present many parallel modifications of structure.

The genera exhibit differences in the bones and webs of the feet and the ossification of the bones of the cranium.

Specific differences will be found under their respective headings.

The known North American frogs and toads are embraced in twelve genera and fifty species, of which five genera and eleven species are found in this vicinity. Some of these are

lungless species, all agreeing closely with this description. Up to the time of his paper seventeen species had been described as without lungs, and he had found an additional one, *Spelerpes guttolineatus*.

Of our local forms, those thus described were :

Amblystoma opacum,
Plethodon cinereus,
Plethodon erythronotus,
Plethodon glutinosus,

Spelerpes bilineata,
Spelerpes ruber,
Desmognathus fusca.

³ An explanation of the means of nourishment of the foetus will be found in Note 2, page 13.

less secretive in habit than the salamanders and therefore much better known. The frog has played a part in connection with some great discoveries, notably that of galvanism through Galvani observing the twitching of the muscles of a frog's hind limbs when these were suspended by copper wires which came into contact with iron. The frog and the chick have been employed as good typical examples of vertebrates in the preparation of works on anatomy, histology and embryology. The frog's foot is so frequently used to show the circulation of the blood that dealers in microscopes make a "frog-plate" especially for this purpose. In literature the toad has been mentioned as being venomous and possessed of occult powers. It was long believed capable of producing warts. On account of its insect-destroying propensities, it is now commonly recognized as one of man's best friends in the field and garden.

As ponds and ditches have been drained, the aquatic forms have removed to greater distances from human dwellings, and only the more terrestrial toad and the arboreal tree-frogs have remained. All of our species have been described, but I think the first mention of the cricket frog being found in this region was made in my paper upon salamanders, read before this Society in 1895.

The breeding habits of these animals vary, but all lay their eggs in water or moist places.

The purely amphibious and really aquatic species are three. Of the other eight, one is burrowing, five tend to be terrestrial, inhabiting the woods and fields and two are arboreal. The times and places of breeding, as well as the period of metamorphosis will be mentioned under specific headings.

The frog tadpole ("pollywog") is believed to repeat the history of a fish-like ancestor. Its habits, its mode of breathing, even the arrangement of its blood-vessels and many structural details, are those of fishes. One of the theories of evolution is that during development each animal tends to repeat in some degree the history of its ancestors, and that the later in life variation took place in them, the later in embryonic life would we find the disused structures persisting. *Per contra*, the earliest phases of development must repeat that of the

earliest, *i. e.*, the most remote ancestors. Temporary organs may be of actual use, but there is no good reason why a frog should pass through an aquatic stage of existence when a straight development towards the adult condition could be explained as more seemingly normal, were it not for the persistence of hereditary traits. The *Hylodes* (West Indian frog) omits the tadpole stage entirely.

The tendency to repeat the history of lower ancestral condition is believed to explain the fact that the red blood corpuscles of mammals are at first nucleated, as are those of adult frogs, and the still more striking one that during the period when the unborn human infant gets aerated blood from the lungs of the parent, the septum dividing the right and left auricles has an aperture (*foramen ovale*) which is represented by a constant opening in the adult frog.

In the development of the frog, the embryo leaves the egg in a condition so far removed from that of the adult as to deserve a somewhat detailed account of its growth. The eggs are laid in masses or strings, and are impregnated as they leave the body of the female.¹

They are about one-sixteenth of an inch in diameter, and contain enough food yolk to carry the young to the tadpole stage.²

The eggs are laid in gelatinous envelopes, which swell after leaving the adult. At the time of hatching there are three pairs of external gills, but no mouth or anal opening. To prevent the young tadpole from dropping to the bottom of the pond, where it would soon be smothered in the mud, it is provided with two small "suckers" just back of where the mouth is to appear, and by these it clings to aquatic plants. Soon

¹ The male uses his anterior limbs to seize the female near the fore-legs and presses the eggs from the body. The salamanders seize the female with the hinder feet.

² The chick is developed fully before leaving the egg at the expense of the food yolk. The egg of the frog is sixteen times as large as that of a rabbit, but the embryo of the latter is developed from the time of using food yolk by the placenta, thus receiving nourishment directly from the blood of the mother. As the frog has no membranes for foetal nourishment, the large quantity of food yolk and consequent size of egg are explained.

after hatching the mouth appears, with horny jaws which have a sharp biting beak. The upper jaw has a free edge, upon which are minute, horny teeth; the edge of the lower jaw has small, fleshy papillæ. Between these edges and the beak the upper jaw has three incomplete rows of teeth and the lower jaw four complete rows. At the time of hatching the alimentary canal is perfectly straight, but it soon becomes a long, spirally-coiled intestine. At this stage the tadpole begins to feed. The mouth opens, internal gills soon appear upon fleshy processes of the branchial arches¹ and the external gills soon shrivel and disappear. A hood (*operculum*) grows backward from the arches and soon incloses the gills and fore limbs, which have appeared about this time.² The operculum fuses at the right side and along the lower surface, but an opening remains on the left side through which the external gills often protrude for a time before shrinking. The tadpole then begins to breathe like a fish, taking water into the mouth and passing it through the gills, and finally out of the opercular spout (left-hand aperture). The lungs, which had existed at the time of hatching as diverticula of the œsophagus, now extend along the sides of the body-cavity and begin to be used, respiration for a time being by both lungs and gills. The tadpole comes to the surface for air. The final metamorphosis takes place while the tail is still very long, and is of great interest on account of the changes. The outer layer of skin is cast, the horny jaws are thrown off, the mouth widens and the tongue becomes large, the eyes more prominent, the right fore-leg forces its way through the operculum and the left one appears out of the spout described above. The long intestine takes on a condition of active inflammation and rapidly shrinks to a straight alimentary canal. During this period no food is taken and nutrition is carried on at the expense of the tail,

¹ In fishes the gills are upon the arches themselves. There are no internal gills in salamanders.

² In development the anterior limbs appear first, but are concealed by the operculum. In the salamanders the development is the same, but there is no concealing hood. By this distinguishing character the novice may ascertain whether he has a frog or salamander tadpole.

which is soon absorbed.¹ The gills disappear, the clefts become closed by the fusion of their walls, and the blood-vessels which went to them are divided into those which send blood to the lungs and those which carry mixed blood direct to the body. As the horny beak, used for masticating vegetable food, has been lost, when feeding is resumed it is with the wide mouth of the carnivorous adult frog.

During the period of both gill and lung respiration, if the tadpole is prevented from coming to the surface of the water, no metamorphosis will take place. Retardation also is effected by keeping them in cold water or away from the light.

In my aquarium, which I keep in a darkened room in which the air is always cool, tadpoles of the wood-frog have remained from early in 1895 until now. Small hinder limbs appeared months ago, but no further metamorphosis is visible. Others captured at the same time and kept under ordinary conditions completed their metamorphosis in from six to eight weeks.

Classification and List of our Local Species.

The local fauna is embraced in the following classification :

Class.—*Batrachia*.

Order.—*Salientia*.

SUB-ORDER.—*Arcifera*.

Family I.—*Bufonidæ*.

Family II.—*Scaphiopidæ*.

Family III.—*Hylidæ*.

¹ At the 1896 Liverpool meeting of the British Association for the Advancement of Science, Sir Joseph Lister called attention to the discovery by the Russian naturalist and pathologist, Metchnikoff, that the white blood corpuscles crawl about like amœbæ, and like them, receive nutritious materials into their bodies and there digest them. The tadpole having attained the period for the cyclical change involved in the atrophy of the tail, its materials are absorbed by the white corpuscles, digested and carried to the body for nutrition during the temporary fast of the animal.

SUB-ORDER.—*Firmisternia*.Family IV.—*Ranidæ*.

GENERA AND SPECIES.

Family I.—*Bufo lentiginosus americanus*.Family II.—*Scaphiopus holbrooki*.Family III.—*Acris gryllus crepitans*.*Hyla andersoni*.*Hyla pickeringi*.*Hyla versicolor*.Family IV.—*Rana virescens virescens*.*Rana palustris*.*Rana clamata*.*Rana sylvatica*.*Rana catesbiana*.

Some of the family differences are as interesting as the specific. These and differences in habitat are shown in the following table:

***Bufonidæ*.**

No teeth.

Sacral diapophyses dilated.

Urostyle with two condyles.

Habitat everywhere except Australia. Headquarters,
South America.***Scaphiopidæ*.**Vomerine teeth ; a few undeveloped teeth in margin of
jaw.

Urostyle confluent with sacrum. (No condyles).

Habitat, Northern Hemisphere.

***Hylidæ*.**

Maxillary and vomerine teeth.

Sacral diapophyses dilated.

Urostyle distinct.

Habitat, Europe and America.

In Australia there are *Hylas*, but no toads or frogs. None
in the *Æthiopian* region.

Ranidæ.

Maxillary and vomerine teeth.

Sacral diapophyses cylindric.

Habitat, Europe and North America. None in Australia or South America.

***Bufo lentiginosus americanus* Le Conte.**

COMMON TOAD.

There are four well-defined sub-species of the common toad, one of which is confined to northeastern Massachusetts, one is the Rocky Mountain species, one is southern and one is our own, which extends from British America to Louisiana and west to Arizona.

Color usually yellowish or darker brown above, with pairs of deeper yellow-edged spots on back and with a light vertebral line. One or two yellowish streaks on sides. Below dirty yellow, frequently with black spots. Length, two to three inches. Females larger than males and more variegated in colors. The voice is a wierd *ur-r-r-r*. They rarely walk but progress by hops. Their food consists largely of insects and worms.

Eggs in two long thick-walled tubes of transparent albumen. These tubes lie in long coils on the bottoms of ponds and are laid from about April 20 to May 15, sometimes as late as June. They hatch in about ten days. The metamorphosis is rapid and probably complete in less than a month. The young are very dark and remain so until near the close of the metamorphosis. This is complete when they are about three-eighths of an inch in length. They hibernate very early,—about September 1.

***Scaphiopus holbrookii* Harlan.**

HERMIT SPADE-FOOT TOAD.

This is the *Scaphiopus solitarius* (Holbrook) of DeKay. It is well-distributed but rarely seen, as it spends most of the time in burrows well under ground. The form is robust, the front wide and rounded. Prominent parotid glands. Color dark, sometimes with two pale longitudinal lines. Skin pustular

with small tubercles. The pupil of eye is vertical and cat-like; ¹ iris brassy-colored. Vomerine teeth in two patches. A peculiar spade-like process at the base of inner toe.

The eggs are laid at any time from April to June in bunches from one to three inches in diameter, and are placed around a spike of grass. They hatch in about a week, the metamorphosis being complete in about two to three weeks. The young immediately assume the terrestrial habits of the adult.

***Acris gryllus crepitans* Baird.**

CRICKET-FROG.

This is the *Hylodes gryllus* of DeKay.

The cricket-frog is described in the Geological Survey of New Jersey, as more usually found "in the southern third of the State" and Cope places its northern limit at New Haven. I find it abundant along the Saddle River valley as far north as Hohokus, N. J., and it is sparingly found in the low-lying lands to the east. I have heard their notes at Fort Lee and have captured specimens at Nordhoff. They may be found in numbers around the pond on the old Joseph Jefferson place about one mile east of Hohokus. Very early in the spring and before the appearance of the "peepers" (*Hyla pickeringi*), their rattling, broken cry may be heard. It is not sharp like that of *Hyla*, and would not be noticed unless one were near.

Our subspecies is northern and differs principally from *Acris gryllus gryllus* of the South, in having shorter hind feet, large dermal tubercles and less distinct lines on the posterior face of thigh. General color brownish, with a dark brown triangular patch between the eyes. A dorsal band varying from bright green to a rusty red, which changes to a more subdued color when the animal is frightened. Eyes large and prominent. Length, one inch.

They are rarely found away from the borders of ponds, and their long leaps and swimming powers render capture very difficult.

¹ In the common toad the pupil is horizontal and there are no teeth.

The eggs are laid early in May, in small bunches attached to grass or weeds. Development is prolonged.

***Hyla andersoni* Baird.**

Only three specimens of this frog have been observed, one at Anderson, S.C., one at Jackson, and one at May's Landing, N.J. It resembles in size and appearance the tree-frog of Europe. Cope describes it as of a rather deep pea-green color above, everywhere margined with pure white except posteriorly on the femur and tibia and anteriorly on the former, where a beautiful saffron takes its place.

***Hyla pickeringi* Storer.**

“PEEPER.”

This is the *Hylodes pickeringii* of DeKay.

Nearly everyone has heard the sharp, shrill, penetrating cry of the “peepers” late in March and during part of April, when they repair to shallow bodies of water to breed. Most persons suppose that they have seen this frog, but few recognize it when shown. They may seem to be at one's feet, but only a knowledge of their probable whereabouts will enable one to see them at all during the breeding season. At this time of the year, the pools in the woods and bog-lots seem to be alive with them, but they become silent as a person approaches and dive so quickly out of sight that they are very difficult of capture. During the summer they may be found almost everywhere in the woods at Fort Lee and in Bronx Park, generally clinging to undershrubs and the smaller herbs. Late in the fall, before hibernation, they may be found thickly congregated where *Impatiens fulva* grows along the banks of streams, and their cry is then often as frequent and sharp as during the breeding season.

Color grayish yellow to reddish brown, but nearly white during the summer months. Beneath yellowish white. In spring, the vocal sac is dark brown, and thus distinctly set off from the lighter ventral surface. The lines on the back form a well-defined X. A few brown specks show on posterior of thighs. They are rarely over an inch in length and many are

much smaller. The discs are large and conspicuous and the abdomen and thighs are covered with fine granulations.

The eggs are laid in masses containing from four to ten, and hatch in a few days. The tadpoles are active as soon as hatched and omit the clinging stage, at once swimming about in search of food.

Hyla versicolor Le Conte.

COMMON TREE-TOAD.

This frog is common from British America to Florida and Texas, and is frequently found in orchards and on trees about dwellings. Their cry is a loud, coarse trill, and is thought by many to be a precursor of rain. They are more apt to cry during damp weather, but often may be heard for hours at a time when no rain has been seen in days. I have taken them from the ground in a hot day in July, when others were heard at the tops of tall trees near by. It is said that the Germans keep the European tree-frog captive so as to know when to go to picnics, but ours is unreliable so far as generally observed.

On the 30th of May, I captured over forty among the willows bordering the pond at Nordhoff, where they kept up an incessant clamor. A week later not one was to be found and I set this as the time of their repairing to the water to breed. In summer one will often be seen crouching along an old fence rail, resembling in color the lichens which there abound. They possess in a remarkable degree the power of "color-change," varying from brown or ashy white to gray and green.¹ There are several blotches, one prominently sub-circiform.

Body stout and thick. Eyes large and prominent. Skin warty and coarse. Prominent fold across breast. The feet are more or less webbed, the hinder membranes extending to the discs. Broad discs on fingers and toes. These and parts of the abdomen of tree-frogs secrete a slime or mucus which enables them to cling to smooth, vertical surfaces.²

¹ The color of upper layer of skin is light and changes are produced by introduction of darker color-bearing cells from below.

² The discs are not suckorial organs as commonly believed.

The eggs are laid in small bunches in shallow water, and the metamorphosis is complete while the young are very small.

***Rana virescens virescens* (Kalm) Cope.**

LEOPARD FROG.

This is the *Rana halecina* of DeKay.

Many of the country people in New England call this frog "poison-toad," probably with reference to its bright colors and dark spots, which to them would suggest those of some serpents. It is really our most beautiful frog, varying from a bright bronze along the lighter lines when found near water, to a green when captured in meadows. The species is widely distributed, our subspecies forming one of four found in North and Central America. One occurs in Florida and Georgia, one in Mexico and one on the southern and western plains. Ours is found from Maine to Texas.

In our form there is a black spot on the top of each orbit and several ovate spots ranging from black to dark olive in two rows along the back. Two less distinct rows are seen along the sides. On each side of the dorsal region is an elevated fold of bright yellow, and a very bright bronze line runs from each eye to the nose. The upper surface between the spots and lines varies from a yellowish green to a general yellowish or bronzed olive. The throat is whitish and the abdomen yellowish. They differ from the following species (*Rana palustris*) in the position of the vomerine teeth, the size and arrangement of the spots, the number of glandular folds on the back, and in having external vocal sacs in the males. Eyes large and prominent, pupil black and iris golden yellow.

This species appears very early in the spring and is most frequently found in swampy places. Its voice is a guttural *chock-chock*.

***Rana palustris* Le Conte.**

PICKEREL-FROG.

In general appearance this frog differs from the leopard frog in having four thick folds on the back and four rows of spots. Color pale brown above, with longitudinal rows of square spots on back and flanks. Yellowish white beneath; hinder

part of thighs bright yellow, with black mottlings. Upper part of thighs with transverse bands of dark brown which are represented in *Rana virescens virescens* by dark olive oblong blotches. The under surface of thighs is more granulated than in the leopard frog, and the mottled yellow of hinder part is replaced in the latter by flesh color.

Habitat, cold streams and grassy meadows. Voice, a low, prolonged croak.

***Rana clamata* Daudin.**

GREEN FROG ; SPRING-FROG.

This is the *Rana fontinalis* of DeKay.

This is our common green frog, found near or in every body of water from small brooks to rivers and ponds. Before the metamorphosis is fully completed a ridge or fold of skin extends along the sides from behind each eye, sharply distinguishing the species from the bullfrog, which has no such folds and in general appearance is round-bodied and stouter. The adult growth reaches from three to four inches, while the bullfrog attains from seven to eight in length of head and body. The young generally complete the metamorphosis when about one and one-half inches long, the bullfrog often remaining without limbs until nearly twice this size.

Body stout but not so bulky and clumsy as that of the bullfrog. Head acute, round and deep.

The young require two years to mature and the metamorphosis is readily retarded by keeping them in cold water removed from light.

Color greenish to greenish brown, with indistinct blotches on back, sides and limbs. Frequently the chin and throat are finely netted or spotted with brown. When jumping from the bank they give a sharp, squeaking cry and generally dive with a loud splash. They are decidedly voracious. A specimen of three inches will swallow a large tadpole of its own species, and smaller ones in my aquarium have frequently captured fishes as long as themselves, sitting for hours with the fish's tail projecting from the mouth, waiting for the other end to digest.

***Rana sylvatica* Le Conte.**

WOOD-FROG.

This frog is common in our woods during the summer, most specimens being of a light color somewhat resembling fallen leaves, and all with a black to reddish brown band along the side of the head. During the breeding season the males are nearly black, with a prominent yellowish white line at each side of back. At this period their voices can be heard at quite a distance, resembling at times the barking or yapping of a small dog when close at hand. At a greater distance I have taken their combined voices for the rumbling of an approaching trolley-car.

They appear as early as March 10. I have found numbers in pools in the woods where the winter ice had not half melted. The eggs are laid in masses about three inches in diameter and hatch in about six days. The tad poles are very dark above and peculiarly bronzed underneath. I have found young adults half an inch in length. The metamorphosis is generally complete when a little above this size. In colder waters the tad poles are found during the following winter, and such specimens must undergo retardation of metamorphosis until the following spring. After breeding they soon take to the woods, where they remain until autumn, when they hibernate in mellow soil about two feet from the surface.

Length about two inches. Body flat and broad. Limbs long and slender. Head pointed and broad. Fore feet not webbed. Hind feet webbed except terminal phalanges of all the toes and last two of the longest.

***Rana catesbiana* Shaw.**

BULLFROG ; JUG-O'-RUM ; BLOODY-NOUNS.

This is the *Rana pipiens* of DeKay.

These well-known frogs are not seen as often as the spring-frogs, as they prefer large bodies of water, where they are more inaccessible.

Body very thick and clumsy. Head wide, legs short and

thick. Under *Rana clamata* I have mentioned the lack of lateral folds, which renders it easy to distinguish the adult from that of the latter species. This is by far the largest of our frogs. A chemist of reputation told me of one captive in his laboratory, measuring nineteen inches from tip of snout to extremity of hind leg. The longest specimen in the U. S. National Museum would reach about seventeen inches thus extended, and this may be taken as about the maximum growth.

Color above olive brown, with rather uniformly distributed darker blotches. The young adults have rather sharply-defined black spots on a lighter brownish surface. The blotches become more distinctly transverse bars on legs. Under surface silvery white, everywhere somewhat brownish mottled. The skin above is moderately rough and the hinder faces of buttocks granulated. The fore feet are without any web. The hind feet are fully webbed from tip to tip of the toes, forming a powerful swimming organ.

Voice a heavy bass, which may be heard for miles. Cope says it may be imitated by uttering a bass *br-wum* several times in succession with a hoarse voice while standing in front of an empty cask. The country boys say the frog calls "be-drowned" and "more rum."

Eggs, May and June. Time of metamorphosis, about two years.

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1898-99.

No. 11

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

For the Year Ending March 14, 1899,

WITH

THE TURTLES AND LIZARDS OF THE
VICINITY OF NEW YORK
CITY.

BY EUGENE SMITH.

The Society meets on the second and fourth Tuesday evenings of each month at the American Museum of Natural History, 77th Street and 8th Avenue, New York City.

PUBLICATIONS OF The Linnæan Society of New York.

TRANSACTIONS.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPICE—PORTRAIT OF LINNÆUS.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTHEAST-ERN NEW YORK.
By CLINTON HART MERRIAM, M.D.

General Introduction. Mammalia: Carnivora. Biographies of the Panther, Canada Lynx, Wild Cat, Wolf, Fox, Fisher, Marten, Least Weasel, Ermine, Mink, Skunk, Otter, Raccoon, Black Bear and Harbor Seal.

IS NOT THE FISH CROW (*Corvus ossifragus* Wilson) A WINTER AS WELL AS A SUMMER RESIDENT AT THE NORTHERN LIMIT OF ITS RANGE?
By WILLIAM DUTCHER.

A REVIEW OF THE SUMMER BIRDS OF A PART OF THE CATSKILL MOUNTAINS, WITH PREFATORY REMARKS ON THE FAUNAL AND FLORAL FEATURES OF THE REGION.
By EUGENE PINTARD BICKNELL.

New York, December, 1882.

Price: Paper, - \$2.00. Cloth, - \$3.00.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume II., Royal Octavo, 233 pp. Contents: FRONTISPICE—PLATE OF BENDIRE'S SHREW.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTHEAST-ERN NEW YORK. (MAMMALIA CONCLUDED.)

By CLINTON HART MERRIAM, M.D.

Contains Biographies of the Deer, Moose, and Elk; of the Moles and Shrews (six species); the Bats (five species); the Squirrels (six species); the Woodchuck, the Beaver, the Porcupine, the House and Field Rats and Mice (seven species), and the Hares (three species).

DESCRIPTION OF A NEW GENUS AND SPECIES OF THE SORICIDÆ. (*Atophyrax Bendirii*, with a plate.)

By CLINTON HART MERRIAM, M.D.

New York, August, 1884.

Price: Paper, - \$2.00. Cloth, - \$3.00.

ABSTRACT OF PROCEEDINGS.

ABSTRACT OF PROCEEDINGS OF THE LINNÆAN SOCIETY OF NEW YORK.

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ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
OF
NEW YORK,
FOR THE YEAR ENDING MARCH 14, 1899.

This is the eleventh in the series of "Abstracts" published by the Linnæan Society of New York, and, like the preceding issues, is prepared mainly as a brief review of the work of the Society during the year closing with the date indicated above. Papers presented before the Society but published elsewhere are given by title only, with proper reference to place of publication.

March 17, 1898.—Public lecture in the lecture hall of the American Museum of Natural History by Mr. Ernest Seton Thompson, entitled "The Mammals of North America," with stereopticon illustrations.

March 22, 1898.—Mr. L. S. Foster in the chair. Eight members and two visitors present.

Mr. Eugene Smith presented "Notes on the Turtles and Lizards of the Vicinity of New York City."

Mr. C. B. Riker spoke of an assembly of Blue Jays (*Cyanocitta cristata*) seen by him in the spring of 1898 near Maplewood, N. J.

April 7, 1898.—Public lecture in the lecture hall of the

American Museum of Natural History by Dr. C. Hart Merriam, entitled "Protective and Directive Coloration of Animals," with stereopticon illustrations.

April 12, 1898.—The Vice-President in the chair. Nine members and one visitor present.

Mr. L. S. Foster was appointed Secretary pro tem. by the Chair, to serve during the extended absence of the Secretary.

Mr. Ernest Ingersoll spoke of the presence in Newport Harbor of the Portuguese Man-of-war (*Physalia pelagica*) and other tropical forms of marine life. This he considered due to the Gulf Stream. Mr. William Ellsworth gave the same influence credit for sending certain species of Squids (*Loligalidæ*) to the waters of Newfoundland.

Mr. William Dutcher remarked that a carcass of the Biscayan form of the Right Whale (*Balæna biscayensis*) had recently been cast upon the coast of North Carolina.

April 26, 1898.—The President in the chair. Eight members and seven visitors present.

Mr. Ernest Ingersoll presented "A Little Biography of the Whip-poor-will (*Antrostomus vociferus*)."

He stated that this species is well represented here by the first of May, and has its complete call upon arrival. Mr. Ingersoll had made a series of observations on the call notes. He has found that the bird never calls when in the air, and that its voice may be heard for half a mile. One individual repeated the cry uninterruptedly eight hundred and thirty-one times in fifteen minutes.

Mr. S. H. Chubb had taken an entire Luna Moth (*Actias luna*) from the stomach of a Whip-poor-will. He had heard the call note of this bird in Greene County, N. Y., on September 8.

Mr. L. S. Foster read the published records collected by the Local Fauna Committee of the Society, concerning this bird. He also stated that a male Whip-poor-will had been shot at Bedloe's Island, New York Harbor, on April 23, 1898.

Mr. W. D. W. Miller exhibited a specimen of the Cave

Salamander (*Spelerpes longicauda*), taken by him on April 23, at Plainfield, N. J.

May 10, 1898.—The President in the chair. Fifteen members and nineteen visitors present.

Mr. F. M. Chapman presented a paper on "The Pelicans of Pelican Island, Indian River, Florida." The Brown Pelican (*Pelecanus fuscus*) breeds in large numbers on this island, the nests being situated in the low mangrove bushes or, more frequently, on the ground. The young are extremely noisy, but strong evidence attests the complete silence of the adult birds. Mr. Chapman exhibited a series of specimens, extending from the pipped egg to the adult bird, and his remarks were also illustrated by a number of lantern slides from photographs taken by himself.

Mr. C. B. Riker exhibited a lantern slide showing a large number of cocoons (*Attacus cynthia*) on an Ailantus tree on Jersey City Heights, N. J.

May 24, 1898.—The President in the chair. Fifteen members and two visitors present.

Mr. W. D. W. Miller was elected a Resident Member of the Society.

Mr. F. E. Johnson read a paper entitled "Some Notes regarding the Carolina Wren (*Thryothorus ludovicianus*)."

Dr. W. C. Braislin exhibited an immature specimen of the Iceland Gull (*Larus leucopterus*), taken off Rockaway Beach, N. Y., on March 9, 1898. [*The Auk*, Vol. XVI., April, 1899, p. 190.]

Mr. F. M. Chapman presented "Remarks on the Relationships and Distribution of the Seaside Finches." He spoke at length of the inter-relations of the five members of this group,—*Ammodramus nigrescens*, *A. maritimus*, *A. m. peninsulæ*, *A. m. macgillivraii*, and *A. m. sennetti*; pointed out the connection existing between their colors and the climatic conditions under which they live; and discussed the nomenclatural standing of the birds now called *peninsulæ* and *macgillivraii*. [See *The Auk*, Vol. XVI., Jan., 1899, pp. 1-12.]

Mr. H. W. Congdon noted the appearance in Battery Park, New York City, on May 9, 1898, of a Mockingbird (*Mimus polyglottos*). He had seen there during this migration several Brown Thrashers (*Harporhynchus rufus*), Chewinks (*Pipilo erythrophthalmus*), and Hooded Warblers (*Wilsonia mitrata*).

Mr. S. H. Chubb reported birds as abundant, but late in arrival. The great May flight in Central Park occurred on May 17.

Mr. A. H. Helme stated that the great flight at Millers Place, Long Island, N. Y., was on May 16, and that he had discovered at this time a nest with two fresh eggs of Cooper's Hawk (*Accipiter cooperi*).

Dr. W. C. Braislin reported the capture of five Caspian Terns (*Sterna caspia*) on Long Island, May 12, 1898.

Mr. F. M. Chapman had observed a Mourning Warbler (*Geothlypis philadelphia*) at Englewood, N. J., on May 22, 1898.

October 11, 1898.—The President in the chair. Ten members and nine visitors present.

Mr. L. S. Foster exhibited a skin of the Black-capped Petrel (*Æstrelata hasitata*) taken on Seneca River, Cayuga County, N. Y., early in September, 1893. Dr. J. A. Allen referred to two other hitherto unpublished records for this species. [See *The Auk*, Vol. XVI., 1899, p. 75.]

Mr. William Dutcher reported that he had seen thousands of Wilson's Petrels (*Oceanites oceanicus*) on July 20, 1898, in lower New York Bay, attracted by the "chum" employed by fishermen in catching bluefish.

He also exhibited a series of skins of the Red Phalarope (*Crymophilus fulicarius*). Ten of these, eight males and two females, struck Montauk Light, night of April 30. He also spoke of the distribution, relative abundance, and changes of plumage of the three North American species of Phalaropes.

Mr. F. M. Chapman stated that he had seen at sea, about one hundred miles east of Virginia, hundreds of thousands

of Phalaropes, appearing like a line of foam on the ocean, as, in rising, they exposed their white underparts.

Dr. L. B. Bishop spoke of an adult female Buff-breasted Sandpiper (*Tryngites subruficollis*), taken on Cape Cod, Mass., on August 16, 1898.

Mr. Dutcher reported that on August 28, 1898, he received a box of two hundred and ninety-one birds, killed by striking Fire Island light-house. Thirty species were represented, including five Worm-eating Warblers (*Helminthus vermivorus*) and one Hooded Warbler (*Wilsonia mitrata*).

Mr. Wm. Dutcher presented to the Society, for conveyance to the Local Collection of Bird-skins in the American Museum of Natural History, ten skins of the Red Phalarope (*Crymophilus fulicarius*), and one skin of the Little Blue Heron (*Ardea cœrulea*), and also one skin of an albino Meadow Mouse (*Microtus riparia*).

The Secretary read a communication from Mr. John H. Sage, of Portland, Conn., giving notes on the spring migration, the great wave having occurred on May 18, 1898. Sixty-five species were identified by him on that day, nineteen species being warblers.

Mr. F. M. Chapman had observed Lincoln's Finch (*Melospiza lincolni*) at Englewood, N. J., on September 10, 1898, and a Loggerhead Shrike (*Lanius ludovicianus*) at Leonia, N. J., on September 27, 1898. Other records for the latter bird were : Ontario, June, 1898, by Mr. Dutcher ; Plainfield, N. J., in August and December, by Mr. W. D. W. Miller ; and New Haven, Conn., by Dr. L. B. Bishop. Lincoln's Finch was reported as not rare at Millers Place, N. Y., by Dr. W. C. Braislin.

October 25, 1898.—The President in the chair. Nine members and thirty-two visitors present.

Mr. W. L. Sherwood and Mr. H. L. Utter were elected Resident Members of the Society.

The Chairman of the Lecture Committee reported the following dates and lectures for the sixth annual course :

1. January 19, 1899. "A Naturalist in Florida." By Mr. Frank M. Chapman.

2. January 26, 1899. "A Naturalist in Labrador." By Dr. Robert T. Morris.

3. February 2, 1899. "A Naturalist on the Plains." By Mr. Ernest Seton Thompson.

4. February 9, 1899. "A Naturalist on the Pacific Coast." By Dr. Bashford Dean.

Mr. F. M. Chapman presented a paper, illustrated by lantern slides, entitled "The Bird Rocks of the Gulf of St. Lawrence."

November 8, 1898.—The President in the chair. Nine members and five visitors present.

Mr. C. G. Abbott was elected a Resident Member of the Society.

Mr. L. A. Fuertes presented "Notes on Birds observed in Florida in March and April, 1898." The locality visited by Mr. Fuertes was Indian River, and he also made expeditions into the surrounding country to view the heronries. He made remarks upon the number of floating islands found in the lagoons occurring in that part of Florida.

Following the stated paper was an exhibition with remarks, by members, of specimens of Black and White Warbler (*Mniotilta varia*), Prothonotary Warbler (*Protonotaria citrea*), Swainson's Warbler (*Helinaia swainsonii*), and Worm-eating Warbler (*Helminthus vermivorus*).

Dr. J. Dwight, Jr., showed a series of these birds and spoke briefly of their plumages and moult. Mr. L. S. Foster read the published records, collected by the Local Fauna Committee of this society, concerning the birds under discussion.

November 24, 1898 —The President in the chair. Eight members and eight visitors present.

Mrs. Parker Morrison was elected a Resident Member of the Society.

There was an exhibition of specimens, with remarks by members, of Bachman's Warbler (*Helminthophila bach-*

mani), Blue-winged Warbler (*H. pinus*), Golden-winged Warbler (*H. chrysoptera*), Brewster's Warbler (*H. leuco-bronchialis*), and Lawrence's Warbler (*H. lawrencei*). The birds were exhibited in large series, especially Bachman's and Brewster's Warblers. Mr. F. M. Chapman spoke of the increase in our knowledge of Bachman's Warbler, showing the fourth known specimen, belonging to the Museum collection, of this bird, and referred to the fact that the first nest and eggs had recently been found in the Mississippi Valley by Mr. Otto Widmann. Dr. L. B. Bishop exhibited an exceedingly fine series of Brewster's Warbler taken near New Haven, Conn., and Mr. L. S. Foster read the published records, collected by the Local Fauna Committee, concerning this group of warblers.

December 13, 1898. — Mr. L. S. Foster in the chair. Twelve members and thirteen visitors present.

Mr. Ernest Seton Thompson presented "Notes on the Texas Wild Cattle," based on his own experience.

An exhibition, with remarks by members, of specimens of the following warblers then took place: Lucy's Warbler (*Helminthophila luciae*), Virginia's Warbler (*H. virginiae*), Nashville Warbler (*H. ruficapilla*), Calaveras Warbler (*H. r. gutturalis*), Orange-crowned Warbler (*H. celata*), Lutescent Warbler (*H. c. lutescens*), and Tennessee Warbler (*H. peregrina*). Mr. L. S. Foster read the published records, collected by the Local Fauna Committee, concerning these birds.

Mr. William Dutcher presented to the Society, for conveyance to the Local Collection of Bird-skins in the American Museum of Natural History, two skins of the American Bittern (*Botaurus lentiginosus*), one skin of the Green Heron (*Ardea virescens*), and two skins of the Hairy Woodpecker (*Dryobates villosus*).

December 27, 1898. — The Vice-President in the chair. Ten members and eighteen visitors present.

The paper of the evening was by Mr. J. D. Figgins, and was entitled "Notes on Birds Observed in Greenland with

the Peary Expeditions of 1896 and 1897." The author treated twenty species of water birds and eight land birds.

Specimens of the Parula Warbler (*Compsothlypis americana*), Sennett's Warbler (*C. nigrilora*), Cape May Warbler (*Dendroica tigrina*), and Olive Warbler (*D. olivacea*) were exhibited and discussed, and the published records of their local occurrence read.

January 10, 1899.—The President in the chair. Eight members and sixteen visitors present.

Dr. J. L. Wortman presented remarks on "The Evolution of the Camel," and exhibited a series of specimens of skulls and feet, ranging from the earliest known representatives from the Eocene of North America down to the modern camel. He referred specially to the modifications which have taken place in the teeth and feet. Dr. Wortman closed his remarks by showing many lantern slides illustrating the Bad Lands of the West, the localities from which these specimens were taken.

The warblers exhibited and discussed were the Yellow Warbler (*Dendroica æstiva*), Black-throated Blue Warbler (*D. cærulescens*), Myrtle Warbler (*D. coronata*), and Audubon's Warbler (*D. auduboni*.)

January 19, 1899.—Public lecture in the lecture hall of the American Museum of Natural History by Mr. F. M. Chapman, entitled "A Naturalist in Florida," with stereopticon illustrations.

January 24, 1899.—The Vice-President in the chair. Five members and one visitor present.

Owing to the small attendance, due to inclement weather, the paper of the evening was postponed.

January 26, 1899.—Public lecture in the lecture hall of the American Museum of Natural History by Dr. R. T. Morris, entitled "A Naturalist in Labrador," with stereopticon illustrations.

February 2, 1899.—Public lecture in the lecture hall of the American Museum of Natural History by Mr. Ernest Seton Thompson, entitled "A Naturalist on the Plains," with stereopticon illustrations.

February 9, 1899.—Public lecture in the lecture hall of the American Museum of Natural History by Dr. Bashford Dean, entitled "A Naturalist on the Pacific Coast," with stereopticon illustrations.

February 14, 1899.—The Vice-President in the chair. Five members and four visitors present.

Dr. J. Dwight, Jr., presented "Notes on the Moults and Plumages of Some of Our Common Birds."

February 28, 1899.—Mr. L. S. Foster in the chair. Nine members and twelve visitors present.

Dr. J. L. Wortman presented remarks on "Explorations for Extinct Reptiles in the Rocky Mountain Plateau Region." The explorations referred to were those conducted by the American Museum during the last two summers in the Jurassic beds near Medicine Bow in Southern Wyoming. Dr. Wortman said that these gigantic extinct reptiles known as dinosaurs were first discovered in this country by Professor O. C. Marsh of Yale, who had obtained his remarkable collection from this locality. This is the richest of the several regions in North America where these reptiles are found. Dr. Wortman described very fully the methods adopted by his party in locating the specimens, removing them from the matrix, and preparing them for shipment; and he showed lantern slides illustrating the work and camp life of the party, and also restorations of dinosaurs by Professor Marsh and Mr. Charles R. Knight.

March 14, 1899.—Annual Meeting. The President in the chair. Eleven members and seven visitors present.

The Secretary presented his Annual Report, as follows :

"The Society has held during the past year sixteen meetings,—two meetings each month, with the exception of June, July, August and September.

"Although the attendance has fallen off slightly from that of last year it has been greater than for any year prior to 1898. The total attendance at all meetings has been 303. The average attendance has been of members 9, and of visitors 10. The largest attendance at any one meeting

was on October 25, when there were 10 members and 32 visitors present.

"Seven Resident Members have been elected, three have resigned, four have been dropped, and two,—Mr. Henry Gade and Mr. Francis M. Harris,—have been lost by death. The membership of the Society at present is, Resident, 161; Corresponding, 35; Honorary, 2—a total of 198.

"Ten authors have presented before the Society thirteen papers on the following subjects: Eight on ornithology, two on mammalogy, two on palæontology, and one on herpetology.

"The sixth annual lecture course of the Society comprised four lectures delivered at the American Museum of Natural History during the months of January and February. The attendance at these lectures was exceptionally good.

"The Society has issued 'Abstract of Proceedings No. 10,' including a paper entitled 'The Frogs and Toads Found in the Vicinity of New York City,' by Mr. William L. Sherwood, and an index, the whole forming a pamphlet of twenty-seven pages. Copies were distributed as usual among the exchanges and one copy was mailed to each member."

The Librarian presented his Annual Report, as follows:

"The Library has been augmented by over 150 publications, chiefly exchanges. Otherwise the Library is in exactly the same condition as last year, no further work having been done on the catalogue."

The Treasurer presented his Annual Report, showing a balance on hand of \$424.10.

The following officers were elected for the ensuing year:

PRESIDENT, Dr. Jonathan Dwight, Jr.

VICE-PRESIDENT, Mr. William Dutcher.

SECRETARY, Mr. Walter W. Granger.

TREASURER, Mr. L. S. Foster.

Mr. Eugene Smith presented a paper on "The Turtles and Lizards of the Vicinity of New York City." [Printed at the end of this Abstract.]

The Turtles and Lizards Found in the Vicinity of New York City.

BY EUGENE SMITH.

Before proceeding to the special description of the reptilian fauna of this vicinity it will be necessary to give a preliminary review of the class Reptilia and its orders, and the differences existing between it and the class of Amphibia or Batrachia.

Most persons use the terms indiscriminately, calling a salamander a lizard, a snake an amphibian, or a frog a reptile. Indeed, it is only within a comparatively recent period that scientists make proper distinctions between these so very different classes of animals. These differences are so great that Reptiles have more affinities with Birds, whilst Amphibia are most nearly allied to Fishes.

In preparing this paper I have referred for general purposes to the following authorities: A. C. Günther and St. George Mivart, Articles on Reptiles, Turtles and Lizards¹; J. E. Holbrook, North American Herpetology; G. A. Boulenger, British Museum Catalogues; Alexander Strauch's Vertheilung der Schildkröten über den Erdball²; D. S. Jordan, Manual of the Vertebrates, etc.³

The descriptions of families and species, as used by me, are largely those of Jordan's Manual. Another paper of value consulted on the Turtles is that of F. W. True, Useful Aquatic Reptiles and Batrachians of the United States.⁴

¹ In Encyclopedia Britannica, 9th edition.

² See Mém. de l'academie impériale de St. Pétersbourg, tome X., No. 13, 1865.

³ 7th edition, 1896.

⁴ See Section One of the Fisheries and Fishery Industries of the U. S., Washington, 1893.

The geographical district embraced in the list averages about thirty miles around New York City.

For the sake of completeness a few species of doubtful occurrence have been included.

Classification and List of Local Turtles and Lizards.

Class *Reptilia*.

Order *Lacertilia*. Lizards.

Family *Scincidæ*. Skinks.

GENUS AND SPECIES :

Eumeces fasciatus (L.).

Family *Teidæ*. Teids.

GENUS AND SPECIES :

Cnemidophorus sexlineatus (L.).*

Family *Iguanidæ*. Iguanas.

GENUS AND SPECIES :

Sceloporus undulatus (Daudin).

Order *Testudinata*. Turtles.

Family *Dermochelydidæ*. Leather Turtles.

GENUS AND SPECIES :

Dermochelys coriacea (Vandelli).

Family *Cheloniidæ*. Loggerhead Turtles.

GENERA AND SPECIES :

Thalassochelys caretta (L.).

Chelonia mydas (L.).

*Species of doubtful occurrence.

Family Trionychidæ. Soft-shelled Turtles.

GENERA AND SPECIES :

Amyda mutica (*Le S.*)**Aspionectes spinifer* (*Le S.*)***Family Chelydridæ.** Snapping Turtles.

GENUS AND SPECIES :

Chelydra serpentina (*L.*).**Family Kinosternidæ.** Box Turtles.

GENERA AND SPECIES :

Kinosternon pennsylvanicum (*Bosc.*).*Aromochelys odoratus* (*Latr.*).**Family Emydidæ.** Pond Turtles.

GENERA AND SPECIES :

Malaclemmys palustris (*Gmel.*).*Pseudemys rugosa* (*Shaw.*).*Chrysemys picta* (*Herm.*).*Chelopus muhlenbergi* (*Schw.*).*Chelopus insculptus* (*Le C.*).*Chelopus guttatus* (*Schn.*).*Emys meleagris* (*Shaw.*)**Cistudo carolina* (*L.*).**Class Reptilia.**

Reptiles are distinguished from the lower class of Batrachia by being perfect at birth, there being no tadpole stage as in the case of frogs and salamanders. When the little turtle, often no larger than a small coin, or the little snake, not bigger than a medium-sized earthworm, escapes from the egg, it seeks food, it swims, crawls or darts about as able as its progenitors. Life begins without parental assistance. In this respect the reptile is more self-sufficient

*Species of doubtful occurrence.

than most birds and all mammals. Reptiles differ otherwise from Batrachia in having scales, scutes or plates instead of a naked skin, though to this there are a few exceptions. The skeleton is more developed and the bones are stronger.

From Birds, on the other hand, they now differ in having no feathers, in not having the power of aërial locomotion, and in having a far less perfect circulatory system. The heart is always located in the pectoral cavity; it has two auricles and one ventricle; the latter is generally imperfectly divided by a septum, and on this account the venous and arterial blood mingles to a greater or less extent in the ventricle. Only in crocodiles is the septum perfect. From the heart three great arterial trunks emerge close together, sometimes from a common point and more towards the right side of the ventricle; one goes to the lungs, the other two unite at some distance from the heart and form the great dorsal aorta. The right auricle receives the three main trunk veins in a sinus venosus, the left auricle receives the pulmonary veins. The right side of the ventricle receives venous, the left arterial blood. Respiration is slow and irregular, and the blood is cold.

Reptiles agree with birds in having perfect lungs at birth; an imperfect diaphragm; a single convex occipital condyle which articulates with the spinal column; and in all having internal fertilization of the eggs, which are large and in most cases hatched outside of the parent's body by solar incubation, or by the heat derived from decaying matter in which they may have been deposited. A few are ovoviviparous.

As in Birds and Mammals, the foetus has an allantois and an amnion. The intestines and urogenital organs open into a common cloaca, as in Birds and Batrachia. Turtles have simple copulatory organs, in lizards and snakes they are paired. As in Birds the mandible consists of several distinct pieces. The articular bone of the jaw plays upon a quadrate bone between the skull and the mandible. Skeletal

differences are very great between the various orders of reptiles, and this is evident at a glance.

Reptiles may have four limbs, or either two front or two hind limbs, or none, or they may be rudimentary, in which case they may be either visible or internal only.

Though reptiles live much in dark or underground places, or in the water, yet as a class they need warmth more than all other vertebrates. Very few are found in the colder climates, and as distance from the tropics increases they rapidly decrease in numbers. All reptiles delight in sunning themselves, lying motionless in the full glare of the sun, as snakes and turtles do, or playing about with great agility like the lizards, but they are ever alert to possible prey or to threatening danger. All are timid animals.

Walk along the edge of a pond. Here and there you will see little points above the water surface ; they may be floating chips or projecting sticks, but the vibration imparted to bank and water by your step, or the sight of your body moving ever so cautiously, suddenly causes these little points to vanish. The turtles have sought refuge in the mud beneath or they are swimming away below the surface. Remain perfectly still, and by and by a nose tip, and gradually a whole head, will re-appear. This is turned about with great caution until the whole field has been overlooked and all danger appears to have passed.

Sit down near an old wall or fence and "study to be quiet" ; presently a pointed little head will protrude from between two stones or from under the bark of a stump ; the head carefully scans its surroundings, the little eyes dance about, and in a moment a bright little elf will crawl out and enjoy the warm light. Soon another and another will appear from their hiding places, and a search for insects begins or a lively game of tag will take place. One inconsiderate move on your part, the fall of a pebble, or even the sudden shadow of a bird flying overhead, and the lizards are gone. Such are some of the peculiarities of this

much despised, much maligned and much persecuted class of animals.

Still, of all living things reptiles are of no less importance as vermin destroyers than birds, they are with few exceptions carnivorous. Lizards and snakes are of great value as insect and rodent eaters. Turtles act as scavengers in the water, but they are frequently destructive to fish.

Turtles are universally used as food by man, while in many countries lizards and snakes, and even crocodiles, are eaten. Excepting the poisonous snakes, the large *Crocodylia* and a few others, reptiles are entirely harmless animals which should be protected instead of persecuted through ignorance and prejudice. Even poisonous snakes, with but few exceptions, are far more useful than dangerous to man. In intelligence lizards outrank all others, whilst turtles show less of it than snakes.

Reptiles are known from the Permian certainly, though there are indications of their having existed in the Carboniferous period. They reached their greatest development during the Cretaceous period.

The total number of Reptile species now known is about 4,000.

ORDERS OF REPTILES.

Owing to their many structural resemblances Birds and Reptiles have been placed together by Huxley in the great group of Sauropsida. Dr. Günther¹ divides the class Reptilia into ten orders, five of which are extinct. The other five, embracing but insignificant animals as compared with their forerunners, are :

Crocodylia, Alligators and crocodiles.

Rhynchocephalia, one genus and species only, the *Hatteria punctata* of New Zealand.

Lacertilia, Lizards.

Ophidia, Snakes.

*Testudinata*², Turtles.

¹ Article "Reptiles," Encycl. Brit., Vol. 20.

² Günther uses *Chelonina* instead of *Testudinata*, using the latter term for a subdivision of the order.

Of these orders only the last three are represented with us, and, omitting the Ophidia, as outside the scope of this paper, we now will take up the remaining two orders.

Order Lacertilia. LIZARDS.

Lizards have in common with snakes imbricated scales (the chameleons excepted). The vent is a cross-slit; the skull bones are separate; the jaws toothed; the dorsal vertebræ and ribs are movable, not grown together as in the turtles. The tongue is free and projectile to a greater or less degree, but is not used for tactile purposes as much as by snakes, owing to the better eyesight of lizards.

Lizards differ from snakes in having non-dilatable mouths; they have four, two or no limbs; a shoulder girdle; long tails; mostly three eyelids (including the so-called nictitating membrane), and a tympanum. A peculiarity of lizards is, that the tails in a great number of them are very brittle and easily snap off. This is due to the fact that there is a thin septum in each vertebra which does not ossify, the break occurring across a vertebra, not between two of them, as is generally supposed. Tails broken off can be reproduced in many species.

The vertebræ are generally procœlus and very numerous, the transverse processes are short and rudimentary. There are never more than two sacral nor more than nine cervical vertebræ. The quadrate bone articulates with the skull.

The lungs are equal in size, except in the snake-like forms in which the right lung is the larger, while the left sometimes becomes rudimentary.

Lizards are terrestrial or arboreal in their habits, preferring warm, dry localities, the only known exception is the seaweed-eating leguan of the Gallapagos Islands.¹ The only lizard known to be venomous is the Gila monster (*Heloderma suspectum*) of the Sonoran Region of North America.

¹ See Darwin, "Voyage of the Beagle."

Lizards are more cosmopolitan than snakes and are found on many islands from which snakes are absent. They first appeared in the Jurassic period.

At present the entire number known probably reaches 2,000. The classification of lizards is based on skeletal and lingual features. Boulenger¹ arranges them into two suborders and twenty-one families. All True Lizards belong to one suborder, the Chameleons forming the second. Our local species belong to three families; two species are positively known, the other is of doubtful occurrence.

Family Scincidæ. SKINKS.

Tongue covered with imbricate, scale-like papillæ; temporal fossæ roofed over by bone; head regularly shielded; scales smooth, underlaid by bony plates; body fusiform or subcylindric; nasal plate single, ungrooved, the nostril in the centre; head usually without posterior vertical plate. A cosmopolitan family with over 200 species.

Eumeces fasciatus (L.).

BLUE-TAIL. SCORPION.

This species has two supra-nasal plates; a large ear, the front edge of which is toothed. It has teeth on the palate and is quite a hard biter when carelessly handled. It grows to a length of 8 to 11 inches; its color is quite variable, but generally dark olive, with five yellowish streaks, the middle one of which forks on the head; the tail is bright blue, but in older specimens it becomes reddish, as well as the body and head, while the stripes become very dull or disappear. Older specimens often are called Red-heads, but that name applies more properly to a distinct species of the Southern States.

This lizard is quite common throughout the United States east of the Rocky Mountains. In our vicinity it is not frequently seen, though by no means so very rare. It

¹ Catalogue of Lizards in the British Museum. Vol. I., London 1885.

is to be found on the bluffs of the Palisades ; on Bearfort Mountain at Greenwood Lake ; on the rocky bluffs of the Passaic River gorge at Paterson. Abbott speaks of its occurrence at Lake Hopatcong ; Storer in Eastern Massachusetts ; and others mention it from various nearby places.

In confinement it is hardy, but can scarcely be called tamable, as it will use all opportunities to escape. Capture is difficult and often can be effected only with the loss of its very brittle tail. It burrows in the sand or earth, where, too, it hibernates. A worm or a bit of fresh meat placed where it burrows will soon bring it to the surface, the sense of touch or of smell indicating the presence of the food. Flies, roaches and insects generally are eagerly eaten by it.

Family Teidæ. TEIDS.

Tongue flat, elongate, ending in two long, smooth points, its surface covered with imbricate, scale-like papillæ ; premaxillaries single ; temporal fossæ not roofed over by bone. A large American family.

Cnemidophorus sexlineatus (L.).

SIX-LINED LIZARD.

Tail not compressed, shields of head large, eyelids developed, ear exposed, a double collar-fold, scales small, ventral plates large. Length, 6 to 9 inches. Dusky brown, with three yellow streaks on each side ; the spaces between jet black ; throat silvery ; belly blue in breeding male.

Said to occur from Connecticut to Virginia, Wisconsin and Mexico ; habitat, dry, sandy places on the ground ; said to hunt towards evening and to be very timid (Holbrook).

As I cannot find any statement regarding its occurrence within our limits, it is probably very rare in this section of country.

Family *Iguanidæ*. IGUANAS.

The tongue is thick, villous, almost fixed to the floor of the mouth and but little cleft in front. The eyelids are well developed ; head scales usually smaller than those on body. The temporal fossæ are not roofed over. A large family, mostly American. The greater number are insectivorous. The little green fellows sold here as Florida "chameleons" belong to this family. Some of the larger West Indian and South American species are eaten as great delicacies.

Sceloporus undulatus (*Daudin*).

COMMON LIZARD. BROWN SCORPION. SWIFT.

PINE LIZARD.

There is no throat fold ; a distinct tympanum ; scales keeled, those of the back large, mucronate, similar to lateral scales ; head shields striated or wrinkled ; body depressed ; tail slender. Length, 7 inches. Greenish, bluish or bronzed, with dark, wavy crossbands on back. Males blue or green and black underneath, with a whitish cross. Found widely distributed in North America, preferring coniferous lands, where it hunts for insects under the bark of decaying trees and about fences. It is very quick in its motions and difficult to capture. There are several subspecies. It does not range much further east than New York, and is scarce hereabouts. I know of it only from Monmouth County, N. J. De Kay reported it from along the Hudson River in Dutchess and Putnam Counties, N. Y. According to Abbott it is very plentiful in South Jersey. It becomes quite tame in captivity.

Order *Testudinata*. TURTLES.

The order is mainly characterized by having the two main axes of the body approximating in length, while the vertical axis is very short. The head, tail and limbs are all more or less protractile between the upper and lower

enclosing shields. The upper shield is called the carapace, the lower the plastron. The carapace is formed by the coalescing of the vertebræ of the back with the much expanded and suturally united ribs,¹ and usually by an additional series of dermal marginal bones; this whole shield is overlaid by epidermal scales or plates. The plastron is formed by eight to eleven dermal bones which do not represent a true sternum; this shield, too, is covered by epidermal plates. In neither shield do the covering plates agree in size or arrangement with the underlying bones. Both shields are united in varying degree at the sides.

The only parts of the spinal column independently mobile are the neck and tail. There are always eight cervical, twelve dorsal and two sacral vertebræ; the caudal vertebræ vary in number, but they are never numerous. The pelvic bones are not attached to a sacrum. The limbs are four, which sometimes are paddle-like.

The toothless jaws are provided with horny cutting sheaths. The skull is massive, the bones united by sutures; a quadrate is present. There are eyelids and nictitating membrane; also a tympanum. The vent is never a cross-slit. The limbs, head and tail are covered with naked skin, usually more or less provided with scales or tubercles.

The earliest remains of turtles are found in the Triassic formations.

Upwards of 220 living species are now known.

The eastern United States are quite rich in species and bear much resemblance in several respects to the Indian region.

Turtles usually have been subdivided according to their habitat, into marine, fluviatile, paludine and terrestrial.

Of the true land turtles, more properly called tortoises, none are found in the Northern States. Our local species (including those of doubtful occurrence) we will now consider individually.

¹ Except in the *Dermochelyidæ*, which see.

Family Dermochelyidæ. LEATHER TURTLES.

The only family of turtles in which vertebræ and ribs are free and not connected with the carapace proper, which in this case consists of a leathery integument overlying many small suturally united plates. Seven longitudinal rows of these are large and ridge-like ; the intermediary rows are composed of much smaller bones. The plastron is made up of a large, thin median plate, adjoining which there are a few smaller ones. The body is highest in front. The limbs are paddle-like, the anterior pair much the longer. There are no nails on the toes.

Dermochelys coriacea (*Vandelli*).

TRUNKBACK. LEATHER TURTLE.

The only species of the family is a large, heavy animal, growing to a length of six to eight feet. The general color is dark brown. It is entirely pelagic in habits and lives in the Atlantic Ocean, northwards as far as Massachusetts and Great Britain. Occasionally met with on our coast. It likewise occurs in the warmer parts of the other oceans.

Family Cheloniidæ. LOGGERHEADS.

Here the heart-shaped carapace is broad and flat, covered with bony plates. It is highest in front. The plastron consists of nine bones. The limbs are paddle-like, the feet scaleless, the toes bound together by the integument. The head is large, the jaws without tooth-like projections along the edge. This also is a pelagic family and comes shoreward only to deposit its eggs. As a whole the Loggerheads include the most valuable of the turtles for economic purposes. Tortoise shell comes from a species of this family.

Thalasseochelys caretta (*L.*).

LOGGERHEAD.

This large species has the plates of the carapace not imbricated ; there are two nails on each foot ; the cutting

edge of the lower jaw is not serrate. It is said to grow to a length of six feet or more. This species is of a brown olive color above, the shell of not much value as "tortoise." It is occasionally hooked by anglers on our shores. Its distribution is wide along our Atlantic coast from Massachusetts to Brazil ; in Europe from Scotland southwards, as well as in the Mediterranean Sea. The flesh is not very palatable, but the eggs are sought for. It does not breed as far north as our local shores.

***Chelonia mydas* (L.).**

GREEN TURTLE.

The carapace plates are thin and not imbricate. The limbs are paddle-like, with a single nail on each foot. The lower jaw has a cutting edge. The animal is herbivorous. The color of the upper parts is dusky greenish or olive. This turtle, which is occasionally taken on our shores, though only small specimens, grows to a weight of, it is said, a thousand pounds off the southern Florida coast. Its range is from Rhode Island to Brazil. On the other side of the Atlantic its range is said to be southward along the west coast of Africa, as well as northward to England. The breeding season lasts from April to July, when they lay their eggs on the Florida and West India shores. In addition to the food value of the flesh and eggs, the latter also are used for making oil.

Family Trionychidæ. SOFT-SHELLED OR RIVER TURTLES.

Here the limbs are no longer paddle-shaped ; the feet are capable of free movements. The body is flat, the carapace not fully ossified ; along the margin of the body the tough covering skin is quite flexible owing to the absence of dermal bones. The neck and head are long the snout pointed and tubular. The feet are broadly webbed. The plastron consists of nine bones.

These turtles are all savage animals, capable of inflicting severe bites, and without doubt they are very destructive to fish. Their flesh and eggs are considered very eatable, and their capture is usually made by hook and line or by shooting them. Sluggish, mud-bottomed waters are preferably their abodes. They are of very wide distribution and vary in size up to three feet or more.

If any of the soft-shelled turtles occur nearby, no record to my knowledge has ever been made of that fact. The "Descriptive Catalogue of the Vertebrates of New Jersey" (a revision of Dr. Abbott's Catalogue of 1868), by Julius Nelson,¹ gives the following two as salt water turtles:

***Amyda mutica* (Le S.).**

LEATHERY TURTLE.

"An occasional specimen has been met with in the Raritan River. None appear to be found in the Delaware. Occasionally seen in the Hudson."

***Aspionectes spinifer* (Le S.).**

COMMON SOFT-SHELLED TURTLE.

"Found in all the salt water rivers and creeks."

These statements are erroneous. The Trionychidæ are distinctly not salt water turtles, and it is very doubtful whether they do occur here at all. Through the Erie Canal one species has entered the upper Hudson River,² and there is a possibility that it may also have reached the Delaware River by way of the Delaware and Hudson Canal. Of late years a few have been found in the Delaware watershed.³

¹ See Final Report of the State Geologist. Vol. II., pt. 2. Trenton, 1890.

² Holbrook.

³ See American Naturalist, Vol. XXVIII., 1894, p. 889. "Trionychidæ in New Jersey."

Family Chelydridæ. SNAPPING TURTLES.

The shell is higher in front, sloping backwards, so that the body is heavy in front ; head and neck large and very projectile, the snout pointed, jaws hooked ; tail long, compressed, with a horny crest, alligator-like. The plastron is small and cross-shaped, composed of nine bones, leaving the limbs largely uncovered, even when drawn close to the body.

Chelydra serpentina (L.).

COMMON SNAPPING TURTLE.

This is perhaps the most widely known of all our turtles and grows to a size of two feet or over. General color dusky brown or blackish, sometimes blotched, head with dark spots. The iris grayish yellow, with darker lines radiating from the pupil. When old the back is often partly overgrown with algæ (confervæ), giving it the appearance of a moss-grown stone or piece of tree bark. Smell very musky. The young are much keeled and look like water-soaked walnuts. A very common animal, ranging from Canada to Ecuador, but in the United States not west of the Rocky Mountains.

It prefers soft-bottomed waters, or sloughs, where it lies in the mud, only the nose protruding, awaiting prey, which consists of every thing of an animal nature within reach. The jaws are very strong and capable of dangerous bites. A severed head will not let go its grip for a long while. Said to grow to a weight of over forty pounds. The meat is edible unless the animal is too old. Very hardy in captivity, but dangerous to most all of its fellow captives. It is extremely voracious, and is said to draw ducks and geese under water to devour them at leisure.

About the middle of June in this vicinity the snapping turtle lays from twenty to forty eggs, often quite away from the water.

Family **Kinosternidæ**. BOX OR MUSK TURTLES

Shell more elongate, rising towards the rear, so that the weight of the animal lies backwards of the center ; plastron somewhat cross-shaped, though not nearly so much as in the snapping turtle ; it consists of eight bones ; the front and sometimes also the rear part is movable. The head is pointed, the jaws strong, the limbs weak.

These turtles are voracious and good scavengers, and of somewhat nocturnal habits.

Kinosternon pennsylvanicum (*Bosc*).

MUD TURTLE.

The two lobes of the plastron of nearly equal length, movable so as to shut up against the carapace, though when the animal becomes fat the closing can be done but imperfectly. The carapace of the young is but little keeled. Color of the shell, brown, more or less dull, the edges of the plastron plates lighter in color, the plates much striate along their inner margins. The head is darker, with light dots or stripes. Length, four inches. Occurs from New York to Florida, but is here quite rare. This is less of a water turtle than the others of the family and frequently burrows in drier ground, where it also hibernates. It is harmless in its habits.

Aromochelys odoratus (*Latr.*).

MUSK TURTLE. STINK POT.

In this species the rear lobe of the plastron is the longer ; the lobes cannot close the shell nearly as much as in the former species. The carapace is much keeled in the young and traces of the keels can be found in the adult ; carapace somewhat pointed in the rear. Head large, jaws strong. Color dusky brown or olive, with small and indistinct spots or markings ; lighter beneath ; neck with two yellow stripes.

Very abundant throughout the eastern United States as far west as Illinois.

This turtle gives off a fetid, musky odor. It is a very voracious animal, a vicious biter, and altogether is a small understudy of the snapping turtle. Older specimens frequently are overgrown with *confervæ* and plentifully covered with small leeches. They are quite active, and when very small can be kept with fishes in the aquarium. They are slow growers and will live for years in captivity, apparently better than any of our other turtles.

Family *Emydidæ*. POND TURTLES.

Carapace ovate, broader behind, edge of shell more or less flaring out, usually less convex than in the previous two families; plastron larger, more rigid, of nine bones. Toes more or less webbed, according to their habitat. Active turtles, mostly of diurnal habits.

This family embraces the greater number of all turtles now living. It is subdivided according to the presence or absence of a movable cross-hinge on the plastron, and also by the aspect of the alveolar surfaces of the jaws.¹

Malaclemmys palustris (Gmel.).

SALT-MARSH TURTLE. DIAMOND-BACK. TERRAPIN.

Alveolar surface of the jaws broad and smooth, a deep groove in front; edges of jaws smooth, upper jaw not notched in front; carapace depressed, keeled in the young and less so in the adult; toes short, webbed. Color greenish to olive, of different shades, plates of both shells with more or less pronounced concentric darker bands or lines, sometimes grooved. Length up to ten inches.

Occurs all along our coast from Nantucket to Florida and Texas in salt marshes, and is said to have been found on the South American coast.

¹ That part of the jaw of a turtle corresponding to the part where the teeth sockets are developed in other reptiles.

This is apparently the only turtle (excepting the few really marine species) which frequents salt water. It is much sought for and highly valued as a delicacy, and is now systematically raised for market, since the wild animal is becoming scarce. The diamond-back is a slow breeder, laying only five to seven eggs about the beginning of July. It is occasionally found on the shores of Long and Staten Islands and New Jersey.

***Pseudemys rugosa* (Shaw).**

RED-BELLIED TERRAPIN. SLIDER.

Alveolar surface of upper jaw divided by a longitudinal tuberculated ridge parallel to its margin ; jaws serrate, tip of upper with a hook ; carapace hardly keeled, depressed ; toes short, webbed. In coloration it is an exceedingly variable species ; dusky or blackish with irregular red markings above and along rim of shell ; plastron red or yellowish with dusky shades ; head and neck brown with yellow or red lines. Length, eleven inches.

This turtle occurs in the Chesapeake and Delaware drainages. De Kay¹ speaks of it from near New York City. I have not found it. Holbrook² says it is generally met with in running water, preferably that with rocky bed. The slider is much used as a substitute for the real diamond-back terrapin, now that the latter turtle is becoming scarce.

***Chrysemys picta* (Herm.).**

PAINTED TURTLE. MUD TURTLE.

Alveolar surface of jaws narrow, the groove well marked, except in front ; carapace depressed, never keeled ; toes webbed ; upper jaw notched in front. The young are orbicular in shape. Color greenish or brownish black, margin of plates paler, with sometimes a little red, marginal

¹ *Op. cit.*

² *Op. cit.*

plates with much red ; plastron yellow or brownish ; legs and tail with red lines, head with yellow lines, neck with red and yellow lines. Length, eight inches.

Eastern United States from Nova Scotia to Louisiana. The western species of the genus are possibly only varieties of this species.

The most plentiful of our turtles, found indifferently in ditches, ponds, streams or swamps. It is always amusing to see them bask in the sun on logs, stumps or banks, in long rows and of all sizes, and at the least alarm drop with a slump, one after the other, into the water.

Though wary when wild, they soon learn to take food from the fingers of their captor. They are more delicate than any of the other species and are kept alive over winter with difficulty unless permitted to hibernate. The young will frequently feed on the delicate leaves of aquatic plants, like sagittaria and vallisneria.

The next genus, *Chelopus*, is characterized by a narrow alveolar surface of the jaws, a well arched carapace and but slightly webbed feet. There are three species here.

***Chelopus muhlenbergi* (Schweigger).**

MUHLENBERG'S TURTLE. MUD TURTLE.

Upper jaw deeply notched and arched downward ; carapace little keeled. Color brown with yellowish markings, plastron black with yellowish blotches, an orange spot on each side of the neck ; plates of back plain or concentrically grooved. Length, four and a half inches. Occurs in Southern New York, New Jersey and Pennsylvania. It is usually found in restricted localities in swampy places.

***Chelopus insculptus* (Le Conte).**

WOOD TORTOISE.

Upper jaw deeply notched and arched downward ; head narrower below than above ; carapace keeled, plates marked with concentric grooves, as if roughly cut in wood.

Color brownish or darker, plastron lighter brownish with a black blotch on each plate. Length, 8 inches. Eastern United States, from Maine to Pennsylvania and Ohio.

This, though given as living mostly in ponds, appears to be the most terrestrial of our turtles next to the Carolina box turtle, and is quite a good walker, raising itself well from the ground. It appears constantly on guard, ready to defend itself.

***Chelopus guttatus* (Schn.).**

SPECKLED TORTOISE. SPOTTED TURTLE.

Carapace not keeled, upper jaw notched but slightly. Black with well-defined roundish orange or yellow spots, which vary from sparse or almost absent to thickly scattered; plastron yellow or flesh color, blotched with black. Length, four and a half inches.

New England to Pennsylvania and Indiana. Common both in running and stagnant water, as well as in bogs. This species is hardy in captivity and becomes very tame; its disposition towards others is harmless.

***Emys meleagris* (Shaw).**

BLANDING'S TURTLE.

Plastron with a movable transverse hinge across its middle; the lateral suture between both shells also cartilaginous; body depressed, plastron emarginate behind; toes webbed. Black, usually with yellowish spots, which become more elongate and streak-like as they reach the margins of the plates; plastron yellowish and black; head and limbs with yellow spots and markings. The chin, lower jaw and neck bright yellow. The young are black and nearly circular. Length, eight inches.

This animal is described as occurring from New Hampshire and Massachusetts westward to Michigan, Illinois and Wisconsin. Abbott¹ mentions it from central New Jersey.

¹ See "A Naturalist's Rambles about Home."

The statements of authors concerning it are summed up in the words "scarce," "rare," "seldom seen," etc.¹ It is very closely related to *Emys europæa* (Schn.) of Europe-Asia, and views have been expressed as to its being identical with it. If so, no facts are known of its occurrence in the vast region lying between our North Central States and the arid region of Central Asia. A statement by Duméril, that it was found in Japan, has been doubted by Strauch and never seems to have been further confirmed.²

As dealers and sailors now-a-days frequently bring over the European species, there is a possibility of finding stray specimens nearby, so that identifications must be carefully made to avoid mistaking the two turtles.

Our species has a more elongate form and the carapace is arched considerably more than in the European species. The chin and jaws, too, are far more yellow in extent of color. The meagre descriptions of our species seem to indicate it as somewhat more of a terrestrial species, while that of the Old World is quite aquatic in its habits.

***Cistudo carolina* (L.).**

COMMON BOX TURTLE.

Plastron with a movable tranverse hinge permitting it to shut both lobes tightly against the carapace, so that the animal is completely protected within a bony case; the plastron when closed forms an obtuse angle, the point of the angle turned out; the joint of carapace and plastron laterally is also a cartilaginous membrane; the body is highly arched and the margins of the carapace flare out considerably, especially towards the rear. The toes are not webbed; the hind feet have four toes. The young have large keels which are gradually absorbed with age.

The box turtle is very variable in color. The ground is blackish with yellow markings, forming various patterns;

¹ See also L. Agassiz, "Contributions to the Natural History of the U. S. Vols. I. and II. Boston, 1857.

² *Op. cit.*

underneath much blotched. The males have bright red irides, those of the females are duller in color; the body is brownish or darker, with often much bright yellow or orange, especially on the scales of the limbs and on the head and neck. The box turtle is found in the United States from the Atlantic coast to the plains west of the Mississippi River. There are several closely allied species, or perhaps only sub-species, in the South and West, the chief one of which has only three toes on the rear feet.

The only other species of the genus *Cistudo*, three in number, occur in the Indian region.

The box turtle is one of our most common reptiles and is terrestrial in its habits, often wandering a distance from water. It is omnivorous, but seems to subsist largely on vegetable matter. Some of my captives ate lettuce, strawberries, and above all relished blackberries. One killed and ate a little brown snake. They become very tame, and when thirsty or desiring a bath seek the neighborhood of sink or faucet, and with head erect beg for water.

The young are seldom found when of a very small size.

Altogether our local reptilian fauna (omitting the doubtful species) is made up of—

| | | | | | | | |
|----|----------------------|--------------|----|--------|-----|---|------------|
| 13 | Turtles, | belonging to | 11 | genera | and | 5 | families ; |
| 2 | Lizards, | " | " | 2 | " | " | " |
| 15 | Snakes, ¹ | " | " | 13 | " | " | 2 |

forming a total of—

30 species, belonging to 26 genera, 9 families
and 3 orders.

To the north and east of our section their numbers rapidly diminish, while to the south and west they greatly increase, especially in the proportional number of the Lizards.

¹ For the snakes see R. L. Ditmars', "The Snakes found within Fifty Miles of New York City." Abstract of the Proceedings of the Linn. Soc. of N. Y. No. 8. 1896.

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1899-1900.

No. 12.

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK,

For the Year Ending March 13, 1900.

The Society meets on the second and fourth Tuesday evenings of each month at the American Museum of Natural History, 77th Street and 8th Avenue, New York City.

PUBLICATIONS OF The Linnæan Society of New York. TRANSACTIONS.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume I., Royal Octavo, 168 pp. Contents: FRONTISPIECE—PORTRAIT OF LINNÆUS.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTHEASTERN NEW YORK. By CLINTON HART MERRIAM, M.D.

General Introduction. Mammalia: Carnivora. Biographies of the Panther, Canada Lynx, Wild Cat, Wolf, Fox, Fisher, Marten, Least Weasel, Ermine, Mink, Skunk, Otter, Raccoon, Black Bear and Harbor Seal.

IS NOT THE FISH CROW (*Corvus ossifragus* Wilson) A WINTER AS WELL AS A SUMMER RESIDENT AT THE NORTHERN LIMIT OF ITS RANGE? By WILLIAM DUTCHER.

A REVIEW OF THE SUMMER BIRDS OF A PART OF THE CATSKILL MOUNTAINS, WITH PREFATORY REMARKS ON THE FAUNAL AND FLORAL FEATURES OF THE REGION.

By EUGENE PINTARD BICKNELL.

New York, December, 1882.

Price: Paper, - \$2.00. Cloth, - \$3.00.

TRANSACTIONS OF THE LINNÆAN SOCIETY OF NEW YORK, Volume II., Royal Octavo, 233 pp. Contents: FRONTISPIECE—PLATE OF BENDIRE'S SHREW.

THE VERTEBRATES OF THE ADIRONDACK REGION, NORTHEASTERN NEW YORK. (MAMMALIA CONCLUDED.)

By CLINTON HART MERRIAM, M.D.

Contains Biographies of the Deer, Moose, and Elk; of the Moles and Shrews (six species); the Bats (five species); the Squirrels (six species); the Woodchuck, the Beaver, the Porcupine, the House and Field Rats and Mice (seven species), and the Hares (three species).

DESCRIPTION OF A NEW GENUS AND SPECIES OF THE SORICIDÆ. (*Atophyrax Bendirii*, with a plate.)

By CLINTON HART MERRIAM, M.D.

New York, August, 1884.

Price: Paper, - \$2.00. Cloth, - \$3.00.

ABSTRACT OF PROCEEDINGS.

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| No. 1, | for the year ending March 1, 1889, | 8vo, paper cover, | 9 pp. |
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| No. 10, | " " " 8, 1898, | " " | 27 pp. |
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ABSTRACT
OF THE PROCEEDINGS OF THE
LINNÆAN SOCIETY
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NEW YORK,
FOR THE YEAR ENDING MARCH 13, 1900.

This is the twelfth in the series of "Abstracts" published by the Linnæan Society of New York, and, like the preceding issues, is prepared mainly as a brief review of the work of the Society during the year closing with the date indicated above. Papers presented before the Society, but published elsewhere, are given by title only, with proper reference to place of publication.

March 28, 1899.—The President in the chair. Eight members and thirteen visitors present.

Mr. Ernest Ingersoll presented extended remarks on "Scenery and Life in British Columbia," illustrated by about seventy-five lantern slides.

April 11, 1899.—No quorum present.

April 25, 1899.—The President in the chair. Five members present.

Mr. L. S. Foster read a paper entitled "Suggestions Regarding the Study of Ornithological Literature." The subject was treated from various standpoints, and the paper contained copious references to topics and publications.

Specimens of the following species were exhibited and discussed, viz.: Magnolia Warbler (*Dendroica maculosa*), Cerulean Warbler (*D. cærulea*), Chestnut-sided Warbler (*D. pennsylvanica*), Bay-breasted Warbler (*D. castanea*), Black-poll Warbler (*D. striata*), Blackburnian Warbler (*D. blackburniæ*), Yellow-throated Warbler (*D. dominica*), Grace's Warbler (*D. graciæ*), Black-throated Gray Warbler (*D. nigrescens*), Golden-cheeked Warbler (*D. chrysoparia*), Black-throated Green Warbler (*D. virens*), Townsend's Warbler (*D. townsendi*), and Hermit Warbler (*D. occidentalis*). The published records of those occurring near New York City, as compiled by the Local Fauna Committee of the Society, were read.

May 9, 1899.—No quorum present.

May 23, 1899.—The President in the chair. Five members and one visitor present.

Mr. L. S. Foster presented a paper entitled "Remarks on the Derivation of Some Names Used in Zoölogy." It was preliminary in character, but pointed out some peculiarities in our present nomenclature.

The Warblers exhibited and discussed were Kirtland's Warbler (*Dendroica kirtlandi*), Pine Warbler (*D. vigorsii*), Palm Warbler (*D. palmarum*), Yellow Palm Warbler (*D. p. hypochrysea*), Prairie Warbler (*D. discolor*), and the Water-Thrushes (*Genus Seiurus*).

Dr. J. Dwight, Jr., presented a paper entitled "Remarks upon Some of the April Birds of Georgia." During a recent visit to Thomasville, Georgia, extending from April 5 to 22, 1899, he had observed about seventy species of birds. The country near Thomasville is rolling and covered with pine forests. There are numerous small streams, but the region is a dry one with very few swamps. The unprecedented cold weather of the middle of February, with frost as far south as Miami, Florida, had stripped off all the foliage that ordinarily remains green during the winter, and in consequence new leaves were everywhere sprouting in unusual abundance. The common species of

birds to be expected at such a southern locality were present in considerable numbers, and all of them in full song. A large number of northern species that probably had wintered were still lingering, and the following are of special interest because they were in the midst of their partial pre-nuptial moult, viz.: American Goldfinch (*Astragalinus tristis*), Savanna Sparrow (*Ammodramus sandwichensis savanna*), Grasshopper Sparrow (*A. savannarum passerulus*), White-throated Sparrow (*Zonotrichia albicollis*), Chipping Sparrow (*Spizella socialis*), Swamp Sparrow (*Melospiza georgiana*), Palm Warbler (*Dendroica palmarum*), and Myrtle Warbler (*D. coronata*). A few Robins (*Merula migratoria*) still remained, and Bluebirds (*Sialia sialis*) had begun to nest.

Miss Grace B. Beach stated that she had identified sixty-one species of birds at Dingman's Ferry, Penn., during the first week of May.

October 10, 1899 —The President in the chair. Ten members and twenty-seven visitors present.

Mr. J. L. Childs was elected a Resident Member of the Society.

Dr. J. Dwight, Jr., exhibited three lantern slides of bird feathers, two being photographs showing feathers of the Bobolink (*Dolichonyx oryzivorus*) at different stages of wear.

Mr. F. M. Chapman presented a paper, illustrated by numerous lantern slides, entitled "Bird Studies with a Camera." [See Bird Studies with a Camera, 12mo., New York, 1900.] In the course of his remarks he stated that the Marsh Wren (*Cistothorus palustris*) had been seen by him to puncture the eggs of the Least Bittern (*Ardetta exilis*) the contents being subsequently swallowed by the Bittern on her return to the nest.

October 24, 1899.—The President in the chair. Seven members and seven visitors present.

Mr. Edward W. Berry and Mr. Henry C. Carter were elected Resident Members of the Society.

It was voted to omit the course of public lectures that have been given by the Society for several years at the American Museum.

Dr. J. Dwight, Jr., presented a paper on the "Canadian Birds of August," illustrating his remarks, which were, to a considerable extent, on the moult of birds, by many bird-skins, the several plumages of the same species being shown. Visits during the past few years to eastern Canada and the maritime provinces (except Newfoundland) had given the speaker opportunities to observe birds there during every month in the year excepting January and April. August proved to be a specially interesting month, as it marks the end of the first song season and the beginning of moult in many species. Flocks of land birds begin to assemble early in July, but most species (except the Flycatchers) do not migrate until the moult is virtually completed. All of the *Limicolæ*, however, appear to migrate before moulting. Large flocks of exceedingly shy adults collecting on the reefs much earlier than the tamer young birds, and departing southward earlier than they do.

Mr. A. H. Helme stated that he had taken specimens of the Least Sandpiper (*Tringa minutilla*) on Long Island, in the autumn, which were moulting the quill feathers.

The Secretary read a letter from Mr. John H. Sage, stating that he had seen five Tennessee Warblers (*Helminthophila peregrina*) at Portland, Conn., on May 17, 1899, all in full song; also that more than the usual number of Pigeon Hawks (*Falco columbarius*) were passing on October 9, 1899.

Mr. William Dutcher announced that he had learned that the English Sparrow (*Passer domesticus*) is now to be found in Manila, Philippine Islands.

Mr. W. D. W. Miller reported the Alder Flycatcher (*Empidonax traillii alnorum*) apparently summering at Plainfield, N. J., where he had seen a specimen on July 19, 1899, and taken the bird, which he exhibited, on August 6th.

November 14, 1899.—The usual meeting was omitted, owing to the absence of members at the Congress of the American Ornithologists' Union at Philadelphia, Pa.

November 28, 1899.—The President in the chair. Eight members and sixteen visitors present.

The chair announced that although the annual lecture course would be omitted, one lecture, volunteered by Mr F. M. Chapman, on "A Naturalist in Cuba," would be given on January 11, 1900.

Mr. William Dutcher gave a talk on "Home Life of Birds Through a Camera," illustrated with many lantern slides, notably some of the breeding habits of the Clapper Rail (*Rallus crepitans*) taken on the eastern end of Long Island, and of Albatrosses (*Diomedea immutabilis*) on the Island of Laysan, Hawaiian Islands.

December 12, 1899.—The President in the chair. Eight members and twelve visitors present.

Mr. C. W. Beebee was elected a Resident Member of the Society.

Mr. Thomas Proctor presented a paper on "Our Chewink and His Friends: a Story from an Aviary." He told about a young Chewink (*Pipilo erythrophthalmus*) which he had captured on Long Island, taken home, and reared. He mentioned several interesting facts concerning its development, the most remarkable of which related to its song. From the beginning of its captivity its only feathered companion was an Ortolan Bunting (*Emberiza hortulana*). The Chewink imitated not only the actions but the song of the Bunting, and this to a remarkable degree, the song natural to the Chewink being entirely absent. Other birds he had reared had always before begun with the song peculiar to their species.

December 26, 1899.—The President in the chair. Six members present.

Mr. W. P. Lemmon presented a paper, "Notes on the Taking of a Duck Hawk's Nest on the Palisades," and exhibited five photographs of the locality. The nest was

taken on April 23, 1899, and was reached by means of a long rope.

January 9, 1900.—The President in the chair. Eleven members and twelve visitors present.

The paper of the evening was by Drs. W. C. Rives and W. C. Braislin on "A Trip to the Eastern Shore of Virginia." Two localities on the shore of Virginia were visited late in September, 1899, one being Chincoteague Island and the other Virginia Beach. Dr. Rives described the trip to Chincoteague Island, some of the birds observed there being the following: Laughing Gull (*Larus atricilla*), Least Tern (*Sterna antillarum*), Semi-palmated Sandpiper (*Ereunetes pusillus*), Greater Yellow-legs (*Totanus melanoleucus*), Killdeer (*Ægialitis vocifera*), Sparrow Hawk (*Falco sparverius*), Bobolink (*Dolichonyx oryzivorus*), Meadowlark (*Sturnella magna*), Long-billed Marsh Wren (*Cistothorus palustris*), and Olive-backed Thrush (*Turdus ustulatus swainsonii*). A White-rumped Sandpiper (*Tringa fuscicollis*) was secured, the first autumn record for Virginia. [*Auk*, Vol. XVII., April, 1900, pp. 172, 173.] Dr. Braislin described the trip to Virginia Beach, where the following birds were observed: Pied-billed Grebe (*Podilymbus podiceps*), Northern Phalarope (*Phalaropus lobatus*), Knot (*Tringa canutus*), Sanderling (*Calidris arenaria*), Turnstone (*Arenaria interpres*), Bald Eagle (*Haliæetus leucocephalus*), Boat-tailed Grackle (*Quiscalus major*), Pine Warbler (*Dendroica vigorsii*), Brown-headed Nuthatch (*Sitta pusilla*), Tufted Titmouse, (*Parus bicolor*), and Carolina Chickadee (*Parus carolinensis*). There was a notable scarcity of all species of Sparrows, and no Robins (*Merula migratoria*) were seen.

January 11, 1900.—Public lecture in the lecture hall of the American Museum of Natural History, by Mr. F. M. Chapman, entitled "A Naturalist in Cuba," with stereopticon illustrations.

January 23, 1900.—The President in the chair. Eight members and nine visitors present.

Mr. L. S. Quackenbush was elected a Resident Member of the Society.

Upon motion of Mr. L. S. Foster, the chair appointed Dr. J. A. Allen and Mr. F. M. Chapman a committee to draft resolutions upon the death of Dr. Elliott Coues, an Honorary Member of the Society.

Dr. W. C. Braislin reported having recently seen in Prospect Park, Brooklyn, a flock of thirty-four Crossbills (*Loxia curvirostra minor*).

Dr. J. Dwight, Jr., presented a paper on "The Sequence of Moults and Plumages in the Ptarmigans." [Part of a paper on "The Moults of the North American *Tetraonidæ*" (Quails, Partridges and Grouse.) *Auk*, Vol. XVII., January and April, 1900. pp. 34-51 ; 143-166. pll. v. and vi.]

February 13, 1900.—The President in the chair. Nine members and six visitors present.

Dr. L. B. Bishop gave an extended talk on "A Summer in Alaska." His visit was made during the summer of 1899, in company with two collectors from the Department of Agriculture. The party traveled from the Pacific Coast across the mountains to the head waters of the Yukon River, and thence down the Yukon to St. Michael's. Dr. Bishop's remarks, describing the localities visited and the species of birds observed, were illustrated by a series of photographs and several birdskins collected by him.

Dr. J. Dwight, Jr., made some further remarks on the plumage of the Willow Ptarmigan, illustrated by Dr. Bishop's specimens.

Dr. Bishop reported the capture of a Catbird (*Galeoscoptes carolinensis*) at Guilford, Conn., on January 24, 1900.

February 27, 1900.—The President in the chair. Seven members and twelve visitors present.

The following resolutions upon the recent death of Dr. Elliott Coues were adopted :

"Resolved, That in the death of Elliott Coues, an Honorary Member of this Society, science has lost one of its most indefatigable promoters and ornithology an eminent

authority, whose labors have had an important influence upon the advancement of our knowledge of North American birds. His 'Key to North American Birds,' in its several editions, has been an incentive and an aid to thousands of American bird students, while his other contributions to technical and popular ornithology and to the bibliography of ornithology have covered a wide field and been of inestimable service to his fellow-workers. In his death, many members of this Society recognize the loss of a personal friend and a valued associate.

"*Resolved*, That these resolutions be spread upon the minutes of the Society, and that a copy be transmitted to the family of the deceased.

" J. A. ALLEN,

" FRANK M. CHAPMAN."

Dr. J. Dwight, Jr., presented a paper on "The Wear of Feathers," illustrated by photographs and specimens. Two methods of wear in feathers were described, a chemical change and a mechanical destruction of their substance,—the latter being effected by contact with the grass, shrubbery, etc., and by attrition of the feathers against each other. In the American Crossbill (*Loxia curvirostra minor*) and the Purple Finch (*Carpodacus purpureus*), the loss of the comparatively dull barbules results in a decided brightening of the plumage as the redder barbs are laid bare.

March 13, 1900.—Annual Meeting. The President in the chair. Six members present.

The Secretary presented his Annual Report, as follows: "There have been held by the Society during the year thirteen meetings. The total attendance has been 221, of which 103 were members and 118 visitors, making an average attendance of 17. The largest attendance at any one meeting was 37—10 members and 27 visitors.

"Five Resident Members have been elected, three have resigned, and seven have been dropped. The Society has lost by death, the Honorable Charles P. Daly and Mr.

Cornelius Vanderbilt, Resident Members, and Dr. Elliott Coues, an Honorary Member. The membership at present is, Resident, 154; Corresponding, 35; Honorary, 1—a total of 190.

“Seventeen papers have been presented before the Society, on the following subjects: Fourteen on Ornithology, two on General Zoölogy, and one on Herpetology.

“The usual annual lecture course was omitted and in its place one lecture was given by Mr. F. M. Chapman at the American Museum of Natural History.

“The Society has issued ‘Abstract of Proceedings No. 11,’ to which was appended ‘The Turtles and Lizards of the Vicinity of New York City,’ by Mr. Eugene Smith, and an index, making a pamphlet of thirty-six pages. Copies have been distributed to members and to the exchanges.

“The Library has been enriched by about 200 pamphlets, chiefly exchanges.”

The Treasurer presented his Annual Report, showing a balance on hand of \$582.94.

The following officers were re-elected for the ensuing year:

PRESIDENT, Dr. Jonathan Dwight, Jr.

VICE-PRESIDENT, Mr. William Dutcher.

SECRETARY, Mr. Walter W. Granger.

TREASURER, Mr. L. S. Foster.

Mr. William Dutcher spoke briefly upon bird protection, dwelling particularly upon the Gulls and Terns of the Atlantic seaboard.

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1900-1902

Nos. 13-14

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OF

NEW YORK

For the Year ending March 12, 1901

AND

For the Year ending March 11, 1902

Containing

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THE MAMMALS OF WESTCHESTER COUNTY, N. Y., *By John Rowley*

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NEW YORK,
FOR THE YEAR ENDING MARCH 12, 1901.

THIS is the thirteenth in the series of "Abstracts" published by the Linnæan Society of New York, and, like the preceding issues, is prepared mainly as a brief review of the work of the Society during the year closing with the date indicated above. Papers presented before the Society, but published elsewhere are given by title only, with proper reference to place of publication.

March 27, 1900.—The President in the chair. Ten members and twenty-one visitors present.

Upon motion of Mr. Wm. Dutcher the Committee appointed by the Chair to draft resolutions on the death of Dr. Elliott Coues was retained and empowered to draw up resolutions on the death of Mr. Geo. B. Sennett, a Corresponding Member of the Society.

Mr. R. L. Ditmars presented a paper entitled "The Care of Captive Snakes." He spoke of his early experience with snakes and of the private collection which he owned previous to his taking charge of the Reptile House at the Bronx

Zoological Park. Since then he had had exceptional opportunities for studying live snakes and he mentioned many interesting facts concerning those now in the Park collection, chiefly in regard to their food habits. He placed on exhibition the following species, speaking briefly on each, — a King Snake (*Lampropeltis getulus*) remarkable as being immune to the poisons of other snakes; a Pine Snake (*Pituophis melanoleucus*) which feeds on duck's eggs swallowed entire and broken afterward by bending the body; a Corn Snake (*Callopeltis guttatus*), whose food consists principally of gray rats; a Gopher Snake (*Comptosoma corais*) which is omnivorous; a Black-banded Rattlesnake (*Crotalus horridus*) from Biltmore, North Carolina; and a young Boa Constrictor, one of a brood of sixty-four born at the Washington Zoological Garden, which feeds on trapped mice and sparrows.

April 10, 1900.—The President in the chair. Seven members and five visitors present.

The following resolutions upon the death of Mr. Geo. B. Sennett were adopted:

“*Resolved*, That this Society has learned, with deep regret, of the death of Mr. Geo. B. Sennett, at Youngstown, Ohio, on the 18th of March, 1900. From 1887 to 1889 Mr. Sennett was President of this Society and for a number of years, while he resided in this city, was one of its most earnest supporters, contributing greatly to its scientific activity. He was an enthusiastic ornithologist and his work on Texas birds, both in the field and in museum, resulted in greatly advancing our knowledge of the ornithology of that state. His genial temperament, his conscientious devotion to duty and his keen interest in the welfare of this Society render his loss one to be deeply regretted, not only as that of a personal friend to many of the members but as a loss to ornithology to which he was fondly expecting to devote much of his time in future years.

"*Resolved*, That this minute be spread upon the records of the Society and a copy be transmitted to his widow, who was always his devoted companion and deeply interested in his scientific work.

J. A. ALLEN,
FRANK M. CHAPMAN."

Mr. Arthur H. Helme presented "Notes on the Mammals of Long Island, New York." [Published in full at p. 19 this Abstract.] Mr. William Dutcher stated that he had not found the Pine Mouse (*Microtus pinetorum*) at Montauk Point but had seen the Harbor Seal (*Phoca vitulina*) in the ocean near there.

Dr. J. Dwight, Jr., spoke of the schools of White Porpoises (*Delphinapterus leucas*) he had seen in the Gulf of St. Lawrence and of the porpoise oil industry.

Mr. Thomas Proctor told of the destruction of young birds and birds' eggs in Prospect Park, Brooklyn, by the Gray Squirrels (*Sciurus carolinensis leucotis*).

Mr. Wm. Dutcher made extended remarks concerning bird protection; speaking of the recently passed New York law, the persecution of gulls and terns and the efforts by the committees of the American Ornithologists' Union and of the Audubon Societies.

April 24, 1900.—The President in the chair. Five members and five visitors present.

Mr. L. S. Foster reported that the resolutions on the death of Mr. Geo. B. Sennett had been transmitted to the widow of the deceased.

Mr. Eugene Smith presented "Notes on Some Local Fishes and Batrachians." The notes consisted of a list, with annotations, of ten species of batrachians and fishes either new to the vicinity of New York or before reported as of doubtful occurrence.

May 8, 1900.—No meeting. Through a misunderstanding no room for the evening was available at the Museum.

May 22, 1900.—The President in the chair. Six members and twelve visitors present.

Miss E. G. Foster read a paper entitled "The Birds of Tennyson's Poems." She said that there were mentioned in Tennyson's works sixty-three species of which she had identified fifty-one. These were enumerated and several quotations referring to birds were read.

Mr. Geo. K. Cherrie presented "Notes on Bird Life along the Orinoco River." Arriving at the mouth of the river in September, 1897, Mr. Cherrie spent eighteen months in collecting birds and studying bird life at various points between the mouth and head waters. The following species of North American birds were observed there as winter visitors, Greater Yellow-legs (*Totanus melanoleucus*), Yellow-legs (*Totanus flavipes*), Solitary Sandpiper (*Totanus solitarius*), Whip-poor-will (*Antrostomus vociferus*), Nighthawk (*Chordeiles virginianus*), Black-billed Cuckoo (*Coccyzus erythrophthalmus*), Burrowing Owl (*Speotyto cunicularia hypogaea*), American Redstart (*Setophaga ruticilla*), Black-poll Warbler (*Dendroica striata*), Yellow Warbler (*Dendroica aestiva*) and Summer Tanager (*Piranga rubra*).

October 9, 1900.—The President in the chair. Eight members and thirty-two visitors present.

Mr. F. M. Chapman presented "Bird Studies with a Camera." Illustrated by lantern slides.

October 23, 1900.—The President in the chair. Seven members and six visitors present.

Dr. Jonathan Dwight, Jr., presented a paper entitled "The Moults of the North American Shore Birds (*Limicolæ*)."

[Published in Auk, Vol. XVII, 1900, pp. 368-385.]

Dr. L. B. Bishop gave some of his experiences with the *Limicolæ* in the West and showed that the Killdeer (*Ægialitis vocifera*) began to moult on its breeding ground as shown by the condition of the primaries of a specimen exhibited. He also spoke of the spring migration of 1900 at New Haven,

Conn., as being remarkable for the great numbers of birds passing. At one epoch a strong north wind had retarded the movement. He reported the capture of Lincoln's Sparrow (*Melospiza lincolni*) on May 18, 1900. His experience had led him to conclude that some two hundred and fifty pairs of the Blue-winged Warbler (*Helminthophila pinus*) had bred in the spring of 1900 near New Haven. He exhibited a specimen of Lawrence's Warbler (*H. lawrencei*) taken in the spring which is probably unique as showing, in very marked degree, the characters of both *H. pinus* and *H. chrysoptera*. His remarks on the fall migration at New Haven were interesting; the hawks, it seems, fly due west; of the smaller birds, Robins, thrushes and Flickers fly northwest and the sparrows, warblers, etc., due north.

November 13, 1900.—The regular meeting was omitted owing to the absence of many members at the Eighteenth Congress of the American Ornithologists' Union at Cambridge, Mass.

November 27, 1900.—The President in the chair. Seven members and seventeen visitors present.

Mr. Wm. Dutcher read a paper entitled "With the Sea-birds on the Maine Coast," illustrated with lantern slides. The paper gave many facts concerning bird protection, mainly those connected with the expenditures of the Thayer Fund for the protection of gulls. Excellent lantern slides of coast scenery and sea-bird life were shown.

December 11, 1900.—The President in the chair. Six members and four visitors present.

Mr. W. S. Wallace was elected a Resident Member of the Society.

Dr. Jonathan Dwight, Jr., presented a paper entitled "The Sequence of Moults and Plumages of the *Laridæ* (Gulls and Terns)." [Published in *Auk*, Vol. XVIII, 1901, pp. 49-63.]

Mr. Wm. Dutcher spoke of the extremely early stage at which young Common Terns (*Sterna hirundo*) are able to fly.

Dr. L. B. Bishop recorded the capture, Dec. 3, 1900, of a European Starling (*Sturnus vulgaris*) at New Haven, Conn., the first record of this species for Connecticut.

December 25, 1900.—The usual meeting was omitted on account of its being Christmas night.

January 8, 1900.—The President in the chair. Five members and two visitors present.

Dr. L. B. Bishop exhibited the following interesting bird-skins; three specimens of the Greater Redpoll (*Acanthis linaria rostrata*) from the collection of Dr. Wm. H. Hotchkiss, New Haven, Conn., taken at that place, Dec. 12, 1878, a new record for the State; an English Sparrow (*Passer domesticus*), ♂, juv. taken at New Haven, Conn., Dec. 10, 1900, with the lower mandible destroyed in some manner so that the upper had abnormally developed, due to the peculiar scraping movement employed by the bird in its efforts to obtain food; and an albinistic specimen of the Junco (*Junco hyemalis*), juv., New Haven, Conn., Dec. 21, 1900.

He also spoke of a brood of young Red-shouldered Hawks (*Buteo lineatus*) taken from a nest near New Haven when a few days old and kept for some time in captivity. They were fed entirely upon fresh meat, without bone, and in each one an unmistakable case of rachitis or "rickets" was developed, resulting in their death. Photographs taken at various stages of their growth, were shown, also a deformed humerus of one of the birds. Dr. Bishop thought that the disease was caused by the absence of lime salts in the food given them.

January 22, 1901.—The President in the chair. Six members and four visitors present.

It was voted to give a course of two lectures the coming season, the entire cost not to exceed \$60. The matter of lectures, dates and subjects was referred to the Lecture Committee and the Secretary instructed to notify the Chairman of that Committee of the action taken.

Dr. J. A. Allen presented "The Musk-Oxen of Arctic

America and Greenland." [Published in Bull. Am. Mus. Nat. Hist., Vol. XIV, 1901, pp. 69-86, pll. xii-xvii and figg. in text.] He exhibited skulls of two distinct species of Musk-Oxen; one, the common species from the Hudson Bay country; the other from western Greenland, collected by one of the Peary expeditions and representing a new species.

February 12, 1902.—The President in the chair. Eight members and fourteen visitors present.

The Lecture Committee reported that the committee had arranged for two illustrated lectures to be given at the American Museum: one on Feb. 21st., 1901, by Prof. C. L. Bristol; the other on Feb. 28th., 1901, by Dr. C. Hart Merriam.

Mr. R. L. Ditmars presented a paper entitled "Collecting Snakes in South Carolina." Mr. Ditmar's talk treated of a collecting trip made to South Carolina during the summer of 1900 in the interests of the New York Zoological Society. He spoke of the different species of snakes met with, of their habits and of the various methods employed in their capture. He exhibited specimens of thirteen of the species obtained.

February 21, 1901.—Public lecture in the lecture hall of the American Museum of Natural History, by Prof. C. L. Bristol, entitled "The Sea-gardens of Bermuda," with stereopticon illustrations.

February 26, 1901.—The President in the chair. Seven members and four visitors present.

Prof. Herman C. Bumpus was elected a Resident Member of the Society.

Mr. John Rowley presented a paper entitled "The Mammals of West Chester County, New York." [Published in full at p. 31, this Abstract].

February 28, 1901.—Public lecture in the lecture hall of the American Museum of Natural History by Dr. C. Hart Merriam, entitled "A Naturalist on the Coast of Alaska," with stereopticon illustrations.

March 12, 1901.—Annual meeting. The President in the chair. Ten members and seven visitors present.

The Secretary presented his annual report, as follows: "The Society has held during the year ending this date thirteen meetings. On May 8th no meeting was held through the failure of the Museum authorities to provide a meeting place; the first meeting in November was abandoned on account of conflicting with the American Ornithologists' Union Congress at Cambridge, Mass., and the second meeting in December was also abandoned, falling as it did upon Christmas night.

The total attendance at the meetings has been 206, of which 103 were members and 118 visitors,—an average attendance at each meeting of 16. The largest attendance was on Oct. 9th, when 7 members and 32 visitors were present.

Two resident members have been elected and one has resigned. The Society has lost by death Mr. Frederick Clarkson, Mr. James M. Constable, Mr. John C. King and Mr. Edward B. Squibb, all resident members, also Mr. Geo. B. Sennett, a corresponding member. The membership at present stands, Resident, 150; Corresponding, 34; Honorary, 1—a total of 185.

There have been fourteen papers presented before the Society, one half of these being upon ornithology, the others upon herpetology, mammalogy and ichthyology.

The annual lecture course comprised two lectures given at the American Museum of Natural History in February. Both were well attended.

Abstract of Proceedings No. 12 has been issued by the Society and copies distributed to members and exchanges.

The Library has been enriched by 200 pamphlets, mostly exchanges.

The Treasurer presented his annual report showing a balance on hand of \$846.91.

The Chair appointed as a committee to audit the Treasurer's report, Dr. J. A. Allen and Mr. F. M. Chapman.

The following officers were re-elected for the ensuing year:

PRESIDENT, Dr. Jonathan Dwight, Jr.

VICE-PRESIDENT, Mr. William Dutcher.

SECRETARY, Mr. Walter Granger.

TREASURER, Mr. L. S. Foster.

The Chair appointed the following standing committees for the ensuing year:

Publication, J. A. Allen; Walter Granger.

Finance, William Dutcher; J. A. Allen; L. S. Foster; H. C. Bumpus.

Nominations, F. M. Chapman; William Dutcher; L. S. Foster; Walter Granger.

Papers, Walter Granger; C. W. Beebe; R. L. Ditmars; L. H. Chubb; W. D. W. Miller.

Lectures, F. M. Chapman; J. A. Allen; L. S. Foster.

Mr. Eugene Smith presented an extended paper entitled "The Making and Care of Aquaria."

ABSTRACT

OF THE PROCEEDINGS OF THE

LINNÆAN SOCIETY

OF

NEW YORK.

FOR THE YEAR ENDING MARCH 11, 1902.

THIS is the fourteenth in the series of "Abstracts" published by the Linnæan Society of New York, and, like the preceding issues, is prepared mainly as a brief review of the work of the Society during the year closing with the date indicated above. Papers presented before the Society, but published elsewhere are given by title only, with proper reference to place of publication.

March 26, 1901. — The President in the chair. Six members and one visitor present.

Owing to the small attendance, the announced paper, "A Summer's Study in Nova Scotian Biology" by Mr. C. W. Beebe was postponed. Mr. Beebe gave, however, a short informal talk on the birds met with in Nova Scotia.

Dr. L. B. Bishop gave the following records of birds taken very late in the season in Connecticut; White-throated Sparrow (*Zonotrichia albicollis*) at Guilford, Dec. 19, 1900; Winter Wren (*Troglodytes hiemalis*) at Guilford, Jan. 4, 1901; Field Sparrow (*Spizella pusilla*) at New Haven, Jan. 26, 1901.

April 9, 1901.—The President in the chair. Seven members and seventeen visitors present.

Dr. C. Hart Merriam was elected an Honorary Member and Mr. Millet F. Thompson was elected a Resident Member of the Society.

The paper of the evening entitled "A Summer's Study in Nova Scotian Biology," was read by Mr. C. W. Beebe. His observations, made in the Bay of Fundy region, covered a period of two or three seasons and related to marine as well as bird and mammal life. He exhibited a large number of fine lantern slides illustrating his work.

Mr. William Dutcher called attention to the cruel slaughter of pigeons at the recent trap shooting matches in the vicinity of New York and offered the following resolution.

"Resolved; that the Linnæan Society of New York protests in the most vigorous and emphatic manner against the cruel and degrading so-called sport of trap shooting at pigeons and appeals most earnestly to His Excellency, Gov. Odell to take the most active measures to have some drastic legislation enacted before the close of the present session of the Legislature to repeal the present law permitting such shooting."

The resolution was adopted by unanimous vote and the Chair was requested to forward it immediately, by telegraph, to Gov. Odell.

April 23, 1901.—The Vice-President in the chair. Six members and four visitors present.

The Chair announced that strenuous efforts made to pass the bill to prevent the shooting of live pigeons at traps in New York state, had failed, but the matter was to be taken up again at the next session of the legislature.

The President later assumed the chair and Dr. L. B. Bishop presented two papers, "The Summer Birds of Warren, Connecticut," and "The Winter Birds of Pea Island, North

Carolina." [Published in Auk, Vol. XVIII, 1901, pp. 260-268.]

Mr. Wm. Dutcher reported a Summer Tanager (*Piranga rubra*) taken in Long Island in April, 1901.

Dr. Bishop had found in New Haven, Conn., a nest containing three eggs of the Red-shouldered Hawk (*Buteo lineatus*) and one egg of the Barred Owl (*Syrnium nebulosum*).

May 14, 1901.—The Vice-President in the chair. Five members and five visitors present.

Mr. J. D. Figgins presented "Some Food Birds of the Eskimos of Northwestern Greenland." [Published in full at p. 61 this Abstract.]

Mr. W. S. Wallace presented a paper entitled "Notes on the Snakes of Rockland County, N. Y." His list comprised fifteen species, included in fourteen genera. A notable record was that of the capture of two Brown Snakes (*Storeria dekayi*) on May 11, 1901, one of them being exhibited. The Rattlesnake (*Crotalus horridus*) he considers rather uncommon along the West Shore R. R., and New Jersey and New York R. R., but the Copperhead (*Agkistrodon contortrix*) is still abundant.

May 28, 1901. The Vice-President in the chair. Eight members and twenty visitors present.

Mr. Frank M. Chapman presented "Methods in Bird Photography with an Exhibition of Apparatus and Lantern Slides." After describing several cameras and their construction and manipulation he spoke at length of lenses, tripods, shutters, exposures and telephoto work. A novel method of making a bird take his own picture when alighting was shown. This was accomplished by a moving twig, a system of falling weights, and an electric battery acting upon the shutter. Several braces to steady the front of the camera, especially in telephoto work, were shown.

After the exhibition, by Mr. Chapman, of some thirty lantern slides illustrating the homes and haunts of birds, Mr.

• Fincke described and exhibited several new cameras particularly adapted to animal photography.

October 8, 1901.—No quorum present.

October 22, 1901.—The President in the chair. Six members and ten visitors present.

Mr. Wm. Dutcher presented a paper entitled "Some Bird Studies in Maine." It gave the results of a trip among the water-birds of the Maine coast during the month of June, 1901, and was illustrated by sixty lantern slides. Eight days were spent at Great Duck Island and a large number of the views were of the Herring Gull (*Larus argentatus smithsonianus*) colony, of about 3500 individuals, which he found breeding there. [See Auk, XIX, 1902, p. 44.]

November 12, 1901.—The regular meeting was omitted, the date conflicting with that of the Nineteenth Congress of the American Ornithologists' Union held at the American Museum of Natural History, New York.

November 26, 1901.—The President in the chair.

Mr. Guilbert Ollive Miller was elected a Resident Member of the Society.

The resignation of Mr. L. S. Foster as Treasurer of the Society was read and accepted, and the Secretary was elected acting Treasurer for the unexpired term.

On motion of Mr. Wm. Dutcher a committee consisting of Dr. Dwight and Mr. Chapman was appointed to report upon a lunch fund which had been collected and expended in entertaining the American Ornithologists' Union without the official recognition of the Society.

Mr. C. W. Beebe presented "Notes on Birds in the Bronx Zoological Park." Mr. Beebe gave an account of the habits of many species of birds recently in captivity at the Zoological Park and his notes on the breeding of some of them were especially interesting. In all, fourteen species had successfully bred during the past year, while several more had made attempts at nest-building and incubation. He spoke of the capture, alive,

at the Park of several visiting species of wild birds, including the Canada Goose (*Branta canadensis*), Brünnich's Murre (*Uria lomvia*), and the Black-crowned Night Heron (*Nycticorax nycticorax naevius*).

December 10, 1901.—No quorum present.

December 24, 1901.—This being Christmas Eve the usual meeting was omitted.

January 14, 1902.—No quorum present. Dr. W. D. Matthew, however, read before an interested audience his announced paper on "Climate and Evolution."

January 28, 1902.—The President in the chair. Seven members and six visitors present.

A letter was read from the Secretary of the American Ornithologists' Union thanking the Linnæan Society for hospitalities extended to the Union during its last Congress.

The Chairman of the Lunch Fund Committee reported that the members of the Society had responded in a most liberal manner to the call for subscriptions and that after all bills had been paid a balance of \$157.20 remained. He recommended that this balance be placed in a savings bank as a special lunch fund for future use, and such disposition was made of it by a vote of the Society.

Mr. F. William Hyde was elected a Resident Member of the Society.

Mr. R. L. Ditmars read a paper entitled "The Care of Sick Animals in the Bronx Zoological Park." He gave a very interesting account of the various diseases from which the animals in the Park have suffered and of the remedies which have been tried. An obscure disease which resulted in the death of all but one of the Orang-outans, last summer, was finally traced to the large Galapagos Turtles which were the hosts of an amœba harmless to them but fatal to the Orangs who became infected, doubtless, by playing with the turtles through the bars. Mr. Ditmars also described several surgical operations, with the use of chloroform, one on the face

of a Spider Monkey and another on the foot of a large Alligator, both operations proving highly successful.

February 11, 1902. — The President in the chair. Six members and four visitors present.

Mr. C. W. Beebe presented "Review of the Birds of the Celibes by Meyer and Wigglesworth."

February 26, 1902. — The President in the chair. Six members and three visitors present.

Mr. Wm. Dutcher called the attention of the Society to a bill which had been introduced into the Assembly at Albany recently, allowing the killing, on the premises, of Robins (*Merula migratoria*) by owners or lessees of vineyards in Ulster County, N. Y., from Sept. 16th to Oct. 31st, and moved that the President of the Society write a letter to the Chairman of the Forest, Fish and Game Committee protesting against the passage of this bill. The motion was carried.

Mr. Dutcher reported the passage at the present session of the legislature of the bill forbidding pigeon shooting and presented the following preamble and resolution:

"*Whereas:* The great Commonwealth of New York having had for many years upon its statute books a law permitting the cruel and barbarous practice of shooting pigeons from traps, and

"*Whereas:* For two years the Hon. Samuel Scott Slater, Senator from the 19th Senatorial District, and the Hon. Wm. S. Bennett, Assemblyman from the 21st Assembly District have made a determined and aggressive fight for the repeal of the said law in response to the sentiment of a majority of the citizens of the State, and

"*Whereas:* Success has finally crowned their labors,

"Be it resolved — That the Linnæan Society of New York does hereby express to Senator Slater and Assemblyman Bennett its sincere and earnest thanks for the magnificent results they have accomplished, the influence of which will not only be felt in the Commonwealth they so ably repre-

sent but will also influence humane sentiment in many other localities."

The resolution was accepted by the Society and the Secretary instructed to forward neatly engrossed copies to Senator Slater and Assemblyman Bennett.

Upon motion of Mr. Dutcher it was voted to appoint a committee of two, of which the chair be one, to confer with a like committee from the Audubon Society for the purpose of formulating some plan to interest and instruct school teachers in birds and bird life. The Chair appointed as the other member of this committee, Mr. C. W. Beebe.

Mr. Eugene Smith presented a paper entitled "Some Wild Life in the vicinity of New York City." It was an account of some of the inhabitants of a stretch of marshy ground, perhaps a hundred acres in extent, at the foot of Bergen Hill, New Jersey, not over three miles from the New York City Hall. This ground, owing to its very swampy and treacherous nature has not been occupied by buildings although it is surrounded by a dense population. The vegetation consisted of swamp grass and cat-tails. Mr. Smith mentioned the following species which had come under his observation: Muskrat (*Fiber zibethicus*), not uncommon and their houses built much lower than usual in order, no doubt, to make them less conspicuous; Common Rat (*Mus decumanus*); Common Mouse (*Mus musculus*); Pied-billed Grebe (*Podilymbus podiceps*), observed several times; Clapper Rail (*Rallus crepitans*); Coot (*Fulica americana*); also seven species of reptiles and batrachians.

Mr. Dutcher suggested that the Coots may have been wounded birds as they are not known to breed in this locality. He mentioned a similar locality in Long Island City where, only a few years ago, the Virginia Rail (*Rallus virginianus*), Swamp Sparrow (*Melospiza georgiana*), and Least Bittern (*Ardetta exilis*) were to be found breeding and where in the fall visitors like the English Snipe (*Gallinago delicata*) and Horned Lark (*Otocoris alpestris*) were abundant.

Dr. Dwight spoke of a section of marsh within the residence limits of Boston where twenty-five years ago many pairs of Savannah Sparrows (*Ammodramus sandwichensis savanna*) used to breed annually.

Mr. C. G. Abbott stated that he had seen in January, 1902, fully fifty European Goldfinches (*Carduelis carduelis*) in the grounds of Columbia University at 116th st., New York City.

March 11, 1902.— The President in the chair. Eight members present.

The Secretary presented his annual report as follows:

The Society has held during the year eleven meetings. Two meetings, the first in November and the second in December, were omitted, and on three occasions no meetings were held through failure to secure a quorum, possibly due to the discontinuance of the special card notices to members.

The average attendance has been about the same as for the year previous. Total attendance 161, of which number 74 were members and 87 were visitors. Largest attendance at any one meeting was 27 members and visitors.

"Four members have been elected during the year, six have resigned and two have died. The total membership at present is Resident 146, Corresponding 34, Honorary 2,— a total of 182.

"Eleven papers have been presented before the Society three being upon miscellaneous subjects, one on herpetology and seven on ornithology.

"The usual lecture course was abandoned for the year.

"The annual Abstract of Proceedings, No. 13, was not issued at the usual time but will be published under the same cover with No. 14.

"The usual number of exchange publications, some 250, have been received and added to the Library.

The Acting Treasurer presented his report showing a balance on hand of \$561.24.

Officers for the ensuing year were elected as follows:

PRESIDENT, Dr. Jonathan Dwight, Jr.

VICE-PRESIDENT, Mr. William Dutcher.

SECRETARY, Mr. Walter Granger.

TREASURER, Mr. Lewis B. Woodruff.

The Chair appointed the following standing committees for the ensuing year:

Publication, J. A. Allen; Walter Granger.

Finance, William Dutcher; J. A. Allen; H. C. Bumpus.

Nominations, F. M. Chapman; William Dutcher; Walter Granger.

Papers, Walter Granger; C. W. Beebe; R. L. Ditmars; L. H. Chubb; W. D. W. Miller.

Lectures, F. M. Chapman; J. A. Allen.

Mr. R. L. Ditmars presented a paper entitled "New Observations on Reptiles in the Bronx Zoological Park."

Notes on the Mammals of Long Island, New York.

BY ARTHUR H. HELME.

(Revised to July 15, 1902.)

THE Mammalian fauna of Long Island is of especial interest to students of the geographical distribution, individual variation and development of local forms, the separation of the island from the mainland preventing any influx of new breeding stock from distant localities. The size of the island is such that it is doubtful if new local forms would develop except through a long period of interbreeding of individuals from the same parent stock. The chances of this are largely reduced as the field of the species' wanderings is increased and *vice versa*. This is well illustrated in the case of the Common Meadow Mouse and that of the Gull Island Mouse, the latter being a local form of which the Common Meadow Mouse was doubtless the parent stock. Long Island lying as it does at about the border line between the Upper Austral or Carolinian Fauna and that of the Transitional or Alleghanian, presents in certain mammals forms that are intermediate between those of the southern Atlantic coast and those of the northeastern sections. Here certain birds of the Alleghanian Fauna find the southern limit of their breeding range on the coast, for instance the Black-throated Green Warbler (*Dendroica virens*) and the Saw-whet Owl (*Nyctala acadica*) both of which have been found breeding on Long Island. Here, too, the Acadian Flycatcher (*Empidonax virens*), Carolina Wren (*Thryothorus ludovicianus*) and other Carolinian species find their northern breeding limit on the coast.

Didelphis virginana Kerr. OPOSSUM.

One of the most prominent and characteristic mammals now found on the island is a southern importation. In the early "eighties" reports began to accumulate of the capture of Opossums in various parts of Long Island. In a few years the animal became very common and of general distribution from Brooklyn to Montauk Point, and continues to hold its ground in spite of the fact that several towns pay a bounty for its destruction. Although a species finding more congenial environment in the Southern States, it has well established its ability to withstand our coldest and most severe winters. Its tracks are often noticed in the snow during severe weather, but like the Raccoon it much prefers to lie curled up in some warm burrow during rough stormy weather, unless driven forth by the pangs of hunger. It is doubtful to whom the questionable honor of its introduction to the mammalian fauna of Long Island, is to be accredited. There are several instances reported of the escape and releasing of Opossums on Long Island, about the year 1880, and earlier.

Tursiops tursio (*Fabricius*). BOTTLENOSED PORPOISE.

Delphinus delphis (*Linn.*). COMMON DOLPHIN, SEA PORPOISE.

Phocæna phocæna (*Linn.*). HARBOR PORPOISE,
HERRING HOG.

These three species of Porpoises occur more or less commonly in the waters adjacent to Long Island. As to the comparative abundance of each species, I am unable to speak with any degree of certainty. Porpoises (either *T. tursio* or *D. delphis*) are met with occasionally as early as April and as late as December. From June until late in October they are plentiful in Long Island Sound. For several years one of a creamy white color was noticed in the Sound near Miller Place, returning each year to the same feeding grounds.

I know of no actual instance of the capture of the Gray Grampus (*Grampus griseus* Cuv.) on the coast of Long Island, but there is little doubt that it does occur more or less frequently along the south side, as it has been taken occasionally on the coasts of Massachusetts and New Jersey.

Globicephalus melas (*Traill*). BLACKFISH.

The Blackfish has been frequently reported off the eastern shores of Long Island.

Orca orca (*Linn.*). KILLER.

As to the comparative frequency of occurrence of this and the preceding species, I am uncertain. Both go in schools, and bear a general resemblance to giant Porpoises in their actions. They rarely enter the Sound except at the extreme eastern end. Fishermen occasionally report seeing schools of "Black Whales" and "Fin-Backs," off the eastern end of Long Island. The Killer is frequently called "Fin-ner," and I think is the species referred to as "Fin Back," although the same name is applied to the Fin-backed Whale (*Sibbaldius tectirostris* Cope), a species whose occasional occurrence off the Long Island coast is quite probable.

Hyperoodon rostratus (*Chemnitz*). BOTTLE-NOSED WHALE.

The only instance of the occurrence of this Whale in Long Island waters that I know of, is the record by DeKay of one taken in the lower bay of New York Harbor in 1822.

Physeter macrocephalus *Linn.* SPERM WHALE.

Of the presence of this species I have no knowledge, although it may occur occasionally as a rare straggler. It is said to have been abundant formerly on our coast.

Balæna cisarctica *Cope*. RIGHT WHALE.

This whale is not rare off the southeastern coast of Long

Island, and few years pass that one or more are not reported, usually in winter.

Two other Whales (*Balaena physalus* Linn. and *Agaphalus gibbosus* Erxleben) may occur occasionally.

Odocoileus americanus (*Erxleben*). VIRGINIAN DEER.

Formerly abundant throughout the island but it is now restricted to an area about six miles long by four or five in width, situated in the southeastern portion of Islip township and the southwestern part of Brook Haven township. There it is still plentiful, but doubtless would have long since become only a memory of the past, but for the protection afforded on the game preserves of "The Southside Sportsman's Association," and those of a few private estates. Deer are, however, steadily decreasing in numbers, notwithstanding assertions to the contrary, and unless the laws are more rigidly enforced to prevent reckless and indiscriminate slaughter, both in and out of season, these beautiful creatures will soon cease to grace our woodlands. The deer now at large on Long Island have, I think, become more or less mixed with those that have been introduced from a more southern latitude.

Sciurus carolinensis leucotis (*Gapper*). NORTHERN GRAY SQUIRREL.

This form of the Gray Squirrel is the variety found on Long Island. It is common in most sections where suitable timber and other requisites for its protection and food exist. Specimens have been taken showing slight traces of a rusty and grizzled appearance on the under parts of the body, but they are of rare occurrence.

The Fox Squirrel (*Sciurus ludovicianus vicinus* Bangs) and Red Squirrel (*S. hudsonicus loquax* Bangs) are not found on the island and a young Western Fox Squirrel (*S. ludovicianus*), taken at Miller Place in 1898, is undoubtedly one that had escaped from confinement.

Tamias striatus (*Linn.*). CHIPMUNK.

The Chipmunk is common in most parts of Long Island. While not perfectly typical *striatus* it is nearer this form than it is to *lysteri*.

Arctomys monax (*Linn.*). WOODCHUCK.

Common in suitable localities throughout the island, several of the towns paying a bounty for their destruction, as a result of which they have become greatly reduced in numbers in many localities.

Sciuropterus volans (*Linn.*). FLYING SQUIRREL.

Although seldom seen except by those familiar with its haunts, it is common in suitable localities throughout the island. Unlike its larger relatives — the true squirrels — it seldom ventures abroad during the day, unless disturbed and driven from its home, which is usually in some hole or cavity, often the deserted nest of a woodpecker, in which it has built its own nest of dry leaves and shreds of bark. Sometimes it builds a nest in the branches of a tree, preferably an evergreen, again the deserted nest of a bird or a Gray Squirrel may form its home, after being remodeled to suit its tastes. Its family of young, two to five in number are reared in such situations. I have on several occasions found evidence to cause me to believe that it not infrequently destroys the eggs of birds.

Mus musculus *Linn.* HOUSE MOUSE.**Mus decumanus** *Pallas.* HOUSE RAT.

The House Mouse and the Rat are both abundant in all parts of Long Island.

Mus rattus *Linn.* BLACK RAT.

The Black Rat has long been extinct on Long Island. Many years ago some specimens were caught in a stable in the city of Brooklyn.

Peromyscus leucopus noveboracensis (*Fischer*). NORTH-EASTERN WHITE-FOOTED MOUSE.

Abundant and generally distributed throughout the island, making its squirrel-like nest of dry grasses, slivers of bark, feathers, etc. Sometimes it builds its nest in a clump of briars, or in the branches of trees, usually utilizing some deserted bird's nest for a base, but more frequently the nest is placed in some hole or crevice in a stump or tree, often under a pile of wood, a log or a stump, and even an old oil-can may do service as a shelter. In fact any cavity is chosen that will afford shelter and protection. In winter it is common to find several occupying the same nest, and on two occasions I have found as many as sixteen in one nest. There is considerable variation among the White-footed Mice found on Long Island; but in most cases they can be safely referred to the variety *noveboracensis*.

Microtus pennsylvanicus (*Ord*). MEADOW MOUSE.

Abundant in the open upland fields as well as around the borders of swamps and wet meadows. It is a noticeable fact that the largest specimens I have met with have been taken in dry upland fields. The Gull Island Mouse (*Microtus nesophilus* Bailey) is apparently extinct, as I could find no signs of them on the island in 1898.

Microtus pinetorum scalopsoides (*Aud. and Bach.*). NORTHERN PINE MOUSE.

This mouse is one of the most abundant in dry upland fields and woods. I have never met with it around wet meadows or marshes where the Common Meadow Mouse is so fond of making its home. Its nest of dry grass is generally built beneath the surface of the ground, where the young, two to four in number are reared. I have never heard of a nest containing more than four young.

Fiber zibethicus (*Linn.*). MUSKRAT.

Common in all suitable localities throughout the island.

Zapus hudsonius (*Zimmermann*). MEADOW OR LONG-TAILED
JUMPING MOUSE.

While not rare, and in some localities quite plentiful, it is the least numerous of any of the mice found on Long Island. Although a species that is supposed to hibernate, it is occasionally found abroad in mid-winter, when its tracks have been noticed in the snow.

Lepus floridanus mallurus (*Thomas*). SOUTHEASTERN
COTTONTAIL OR RABBIT.

The Cottontail or Rabbit is abundant in most parts of Long Island, *mallurus* appearing to be the form that prevails, although some specimens appear to closely approach *transitionalis*.

Urocyon cinereoargenteus (*Schreber*). GRAY FOX.

The Gray Fox appears to be nearly extinct on Long Island. Formerly it was fairly common, although never as numerous as its red relative. I am not aware of any recent instance of its capture, but it is not improbable that a few stragglers still remain on the island. On two or three occasions within the past four or five years I have heard of the capture of a gray fox, but, in each instance it proved, upon investigation, to be the Red Fox.

The latest records that have come to my knowledge are, one taken near Bridgehampton and two or three at Setauket.

DeKay in 1842, writes of it as "very abundant on Long Island," and states that it is frequently known under the name of "Plain or Grass Fox."

Vulpes fulvus (*Desmarest*). RED FOX.

Very common throughout Suffolk and portions of Nassau Counties. The usual number of young I have found to be

six or seven, nine being the largest and three the least number I have met with in a litter.

***Lutra canadensis* (Schreber).** NORTHEASTERN OTTER.

DeKay in 1842 writes of the Otter as extinct on Long Island at that time. There is in the collection of the Long Island Historical Society a fine mounted specimen, presented by the late William J. Weeks of Yaphank. It was killed by George Albin of Bayshore and there is no data to indicate when it was taken, but it must have been some time prior to the year 1880, as it was in the collection at that time. There was a specimen taken near Yaphank, somewhere about the year 1875, and possibly this may be the specimen now owned by the Society.

Mr. A. B. Gerard of Brook Haven, Long Island, kindly writes me, "The last Otter killed in this section was in Carmans River by Edward Bartran, station agent at Brook Haven in 1898. The one before that by George Albin of Bayshore and sold to Wm. J. Weeks of Yaphank and presented by Mr. Weeks to the Long Island Historical Society."

I was very much surprised to learn of the recent capture of Otters on Long Island. During the latter part of the winter of 1900-1901, Mr. J. Harrison Hulse of Calverton, caught a large Otter in the river near there and I am informed that evidence of the presence of others has been noticed since the one mentioned was caught. Recently in the "Port Jefferson Times," appeared an item reporting the capture of an Otter at Patchague stating that Mr. Edwin Bailey, Jr., had purchased the animal and was having it mounted. I at once wrote to Mr. Bailey, and he has kindly furnished me with the following details. "The Otter was captured Nov. 29, 1901, by John Gregory of this village, about two miles north of here. It weighed 20 lbs. and measured four feet in length. It is quite black, except the

under parts which are brown. I am having him mounted at Wm. Harts, 12th St., New York." It would be interesting to know where these Otters came from, as it is hardly probable that they could have existed on the island all of this time and eluded capture. It would seem to be more probable that they occasionally stray to the island from the mainland.

Mephitis mephitica (*Shaw*). EASTERN SKUNK.

The Eastern Skunk is common on Long Island but far less numerous than formerly. This decrease in numbers I am unable to account for, unless it be due to the poison used in the potato fields to destroy the "potato bug." It is noticeable that a decrease in their numbers appears to coincide with the appearance of the Colorado Beetle or potato bug. The food of the Skunk consists largely of beetles, and the potato bug forms no insignificant item in its bill of fare. This opinion as to the cause of their diminished numbers is still further strengthened by the fact that the Skunk is as abundant as ever at Montauk Point, where little or no farming is done.

Putorius vison lutrecephalus (*Harlan*). SOUTHEASTERN MINK.

The Mink is fairly common on Long Island wherever there are suitable surroundings for its existence. They appear to vary greatly in numbers from time to time, and they are extensive wanderers, so that they may be here to-day and to-morrow miles away. This disposition to wander appears to be more noticeable in winter and early spring.

Putorius cicognanii (*Bonaparte*). BONAPARTE'S WEASEL.

Of the presence of this species on Long Island, I have no personal knowledge. DeKay in his Mammals of New York, describes a small weasel under the name of *Mustela fusca*,

evidently from Bachman's description of a specimen said to have been "taken in May in Suffolk Co." Mr. Outram Bangs in his paper on the "Weasels of Eastern North America" published in the "Proceedings of the Biological Society of Washington" cites *Mustela fusca* as a synonym of *P. cicognanii*, and gives the distribution of this species as "Northeastern N. A. from Long Island and Conn. north to Labrador" etc., but makes no reference to show his grounds for including it as a mammal of Long Island, probably basing it on Bachman's and DeKay's account. Mr. Gerrit S. Miller, Jr., in his list of the mammals of N. Y. published in "Bulletin No. 29 of the New York State Museum," quotes Mr. Bangs as authority for its occurrence on Long Island. If there are any specimens in existence of undoubted Long Island origin, it would be of interest; and anyone having knowledge of the presence of this species on the island would do well to make known the fact.

Putorius noveboracensis (*Emmons*). NEW YORK WEASEL.

This Weasel is common in most parts of Long Island. It is an indefatigable hunter and as an exterminator of rats and mice has few equals. I once found a family of young Weasels under a pile of wood, where lying all around were remains of moles and mice. Of the former there were three or four which were untouched, while most of the mice were partially eaten. The tenacity with which a Weasel will hold on to an object it has seized is remarkable, but no less so than the agility with which it can avoid a threatened blow. It shows no hesitation in attacking animals many times its size, sometimes to its sorrow. In one instance it attacked a Raccoon with a fatal result for the Weasel. Rabbits often fall victims to Weasels, who can follow them by scent for long distances. That it is able to climb trees is shown by an instance that came under my observation, one being shot from a squirrel's nest about twenty feet from the ground in a

cedar tree. On several occasions I have found dead Weasels and upon examination in most cases I found they had been bitten through the body, as shown by fine teeth marks, evidently inflicted by a cat or possibly by some member of their own species. I have frequently examined specimens taken in mid-winter, but have never found any in the white winter pelage that characterizes this and other species of the genus taken inland and in more northern localities.

***Procyon lotor* (Linn.).** RACCOON.

The Raccoon is common in most parts of Long Island.

***Phoca vitulina* Linn.** HARBOR SEAL.

The Harbor Seal or "Sea Dog" as it is more commonly called is met with occasionally in Long Island Sound, and is of not uncommon occurrence in winter around the eastern end of the island.

***Cystophora cristata* (Erxleben).** HOODED SEAL.

The only record of this seal in Long Island waters is that given by DeKay of "An adult male captured near Eastchester about 15 miles from the city."

***Sorex personatus* Geoffroy St. Hilaire.** MASKED SHREW.

Although rarely seen the Masked Shrew is not rare in most parts of Long Island, and is abundant on Montauk Point. It makes a small spherical nest of dry grass and leaves, placed under an old log or piece of drift wood. Usually only one Shrew will be found in a nest, but on one occasion I found six which, as they were immature, belonged no doubt to one family.

***Blarina brevicauda* (Say).** SHORT-TAILED SHREW.

Abundant in the woodlands.

Scalops aquaticus (*Linn.*). GROUND MOLE.

Common throughout the island.

Condylura cristata (*Linn.*). STAR-NOSED MOLE.

DeKay gives the Star-nosed Mole as "abundant throughout the state." The only evidence of the presence of this species on Long Island that has come to my knowledge is that of a half-grown specimen that I found lying dead in the street at Miller Place. I have searched for it in various parts of the island but have been unable to find any other evidence of its presence, and I have been inclined to think that the one mentioned may have been dropped by a hawk, that perhaps brought it from the Connecticut mainland.

Lasionycteris noctivagans (*Le Conte*). SILVERY BAT.

Some years this Bat is very plentiful especially in late summer and early autumn, out-numbering even the Red Bat, which is usually the most abundant species on Long Island. For the past two or three years very few Silvery Bats have been noticed.

Vespertilio fuscus *Beauvois*. BROWN BAT.

Rare on Long Island. A smaller brown bat is of occasional but rare occurrence but whether *Myotis lucifugus* or *subulatus* I am unable to say.

Lasiurus cinereus *Beauvois*. HOARY BAT.

A rather rare late summer and autumn visitor.

Lasiurus borealis (*Müller*). RED BAT.

Very common. The most abundant Bat on Long Island.

The Mammals of Westchester County, New York.

BY JOHN ROWLEY.

(Revised to July 15, 1902.)

WESTCHESTER County lies north of New York City, its boundary line extending from Spuyten Duyvil Creek up the east bank of the Hudson River to Highland Station, thence to the Connecticut State line, and thence south, striking Long Island Sound at Port Chester. This area contains about 525 square miles. The surface of the country is rough and broken. A number of irregular ridges running chiefly north and south divide it into a series of hills and well-watered valleys, the hills, for the most part, being rocky and wooded, mainly with a growth of deciduous forest trees and underbrush. Some of the ridges rise to an elevation of 1000 feet above tide water. The southeastern portion of the county, adjacent to Long Island Sound, is much flatter and bordered by salt marshes.

At the advent of the white settlers this region must have been a perfect paradise for game and fur-bearing animals. Indeed, the question of game at that period entered so largely into the economy of the inhabitants as to form a part of the consideration in the transfer of real estate. Many of the early deeds contain a clause conferring the right of "Ffishing, hunting and fowling." But the innate desire in man to kill—in colonial times for profit and in later years for mere sport—has gradually done its work and the game has been slowly but surely wiped out. When one considers the close proximity of a great city with its numberless sportsmen, and the persecution to which wild animals are subjected in a district so well populated as this, it is surprising that any

are left out of the great numbers and variety that formerly existed here.

In this paper, I have aimed to present a list of the mammals which have inhabited Westchester County within historic times, with a few notes on their habits and history. The list so far as it pertains to the species now found here, was prepared chiefly from observations made at Hastings-upon-Hudson, about fifteen miles north of New York City, on the east bank of the river; the observations extending over a period of about eighteen years. The nomenclature followed is that adopted in a list of New York mammals by Mr. Gerrit S. Miller, Jr.¹⁰ *

Several species which are known formerly to have existed in the State have been excluded from the list as there are no actual records from Westchester County. The Moose (*Alces americanus*) was very common in the Adirondack region of New York during recent times, but the last one of which there is a positive record was killed at Raquet Lake during the summer of 1861 (Merriam⁹, Vol. II, p. 42). The Wapiti or Elk (*Cervus canadensis*) was also probably numerous in the county at one time, as it is known to have existed in the Adirondack region, in northwestern Pennsylvania and in the adjoining counties of New York State (DeKay⁵). 'In Pennsylvania the animal was not exterminated till within the past 40 years' (Miller¹⁰, p. 301). That it also existed in the western part of this State as late as 1804, the following passage from a description of the Genesee Country by Robert Munro may be offered as evidence: 'Of wild animals, the most remarkable are bears, wolves, and deer, which abound most in the hilly parts; also elks, a large species of deer weighing five or six hundred pounds, and a few panthers' (Docum. Hist.¹² Vol. II, p. 1175). Remains of the Wapiti have been found in a shell heap at Throgg's Neck, this County, by Mr. M. R. Harrington.

* The small numbers refer to papers cited at the end of the present paper.

A few years since, in excavating for a ship canal through Spuyten Duyvil Creek, a portion of a tusk of a Mastodon (*Mastodon americanus*) was unearthed. This fragment is now in the collection of the American Museum of Natural History, New York City.

The Porcupine, Varying Hare, Fisher and Sable were probably not uncommon in this region in early times, but have since been exterminated. There are other species now found in counties adjoining Westchester, some of which will probably be recorded from here, but these have been excluded from the list. Among them are the Short-tailed Weasel, Brewer's Mole, Red-backed Mouse, and Cave Rat (Mearns').

***Didelphis virginiana* Kerr. OPOSSUM.**

The Opossum is an animal whose range has been greatly extended of late years. I recently received from Mr. C. A. Deyo a specimen which was taken in Schoharie, N. Y., and have since heard from him that several others have been taken there.

On Sept. 1, 1899, I found a freshly killed Opossum on the beach at Hastings. This specimen is now in the collection of the American Museum.

Under date of February 20, 1901, Mr. J. H. Quinby of Armonk, Westchester County, writes me, 'about seven of them have been caught near here inside of two years.'

Although heretofore unrecorded from the east bank of the lower Hudson River, it is quite common on the west bank.

Dr. E. A. Mearns' (p. 330), speaking of this animal says, 'In the Highlands, the Opossum has always been fairly common since my boyhood and hence long before its too "successful" introduction on Long Island, N. Y.'

***Tursiops tursio* (Fabricius). PORPOISE.**

It is probable that this species of porpoise occurs within the county limits in the waters of Long Island Sound, as it

has been recorded from both coasts of Long Island (Miller¹⁰), but I have never met with a specimen.

***Phocæna phocæna* (Linnaeus).** HARBOR PORPOISE.

This Porpoise is very common during the summer months in the waters of Long Island Sound, where almost any clear day schools may be seen disporting themselves.

I have seen Porpoises in the Hudson River opposite Hastings, but not for the past five or six years. The species has been recorded as far up the river as Sing Sing (Fisher⁶, p. 200).

***Odocoileus americanus* (Boddert).** VIRGINIA DEER.

Deer were incredibly numerous in this region in early colonial times, Van der Donck, the historian, writing about the middle of the 17th century says: 'The land abounded with them everywhere, and their numbers appear to remain undiminished; we seldom pass through the fields without seeing deer more or less, and we frequently see them in herds (Bolton⁴).'

From DeKay⁵, writing in 1842, I quote (Vol. I, p. 114): 'This well known animal is still found in every part of the State, where there is sufficient forest to afford them food and cover. From the mountainous regions of Orange, Rockland, and Delaware, the City Market is supplied in great abundance during the winter.'

Though still very numerous in the Adirondacks, this species has long since been extirpated in Westchester County. The last one killed in this locality, so far as I have been able to ascertain, is recorded by Dr. Fisher⁶, who says, "The last deer killed near Sing Sing was a doe shot by Mr. Chas. Acker on December 10, 1861. It had been seen on several occasions, at various places, and was finally secured in a tract known as Bacon's woods.'

In some isolated districts on Long Island, where they are

no longer subjected to the ravages of the wolf and are protected by the enforcement of rigid game laws, the Deer is still to be found in considerable numbers in a wild state.

Tradition says that, 'Thirty Deers' Ridge,' a rough, rocky and still uninhabited ridge in the lower part of the county, received its name from the presence of a band of deer which once ranged there.

***Sciurus hudsonicus loquax* Bangs.** SOUTHEASTERN RED
SQUIRREL.

This mischievous little rodent is the most abundant of the squirrels of the county; and his quaint, jerky motions, together with his bold and saucy manner, render him perhaps the best known of our smaller mammals. The Red Squirrel is found wherever sufficient timber exists to afford him an opportunity of exercising his climbing propensities, but he is perhaps more at home in the neighborhood of ever-green growths. He is more carnivorous in his diet than is generally supposed, as birds' eggs and even young birds at times enter into his bill-of-fare. He is wonderfully fond of the seeds of pears, and much damage is sometimes done to the fruit grower by the inroads he makes upon this fruit, for not content with cutting enough to satisfy his immediate appetite, he seems to take great delight in wantonly cutting off the growing fruit and allowing it to fall to the ground, where it remains untouched.

The Red Squirrel is found abroad at all times of the year, even during severe winter weather. At this season I have observed them in greater abundance in the vicinity of hemlock groves, and they then largely subsist upon the hearts of the cones of this tree. The appearance of the Red Squirrel during the coldest weather would seem to indicate that this species does not, as is frequently asserted, lay up a store of food for use during the winter; but if so, the process is not so systematically carried out as by the Chipmunk.

The Red and the Gray Squirrels are sworn enemies. The former is very pugnacious and will generally drive away his larger adversary. This fact, coupled with the emasculated condition in which the males of the larger species are sometimes found, has given rise to the popular fallacy that the Red Squirrel castrates the Gray. Although this may happen in very rare instances, it is a well known fact that the emasculation is performed by the grub of a bot-fly, the *Cuterebra emasculator*, of Fitch (N. Y. Rep. ¹, p. 478).

Sciurus carolinensis leucotis (*Gapper*). NORTHERN GRAY
SQUIRREL.

This beautiful squirrel, though not nearly so common as the preceding species, is found in considerable numbers in suitable situations throughout the county, where it is still sought as game by sportsmen, half a dozen being considered a good day's bag.

I quote from a description of the Genesee Country by Robert Munro, published in 1804, to show their great abundance there at that time (Doc. Hist ¹², p. 1175). 'Squirrels are so numerous some years as considerably to injure corn; and upwards of two thousand of them have sometimes been killed in a day, which is occasionally appointed for that purpose by the inhabitants.'

In some localities two phases of the Gray Squirrel occur, a gray and a black. Both may be found in the same nest and belonging to the same litter, as in the case of the gray and the red phases of the common Screech Owl (*Megascops asio*). I have never seen a black squirrel that was taken in Westchester County.

In this locality the young are born about the middle of March or the first of April, generally in a nest of sticks and leaves built high up in a convenient fork of some large tree. I have also known the young to be brought forth in a hollow tree. When born they are in an exceedingly helpless condi-

tion, with the eyes closed, and devoid of hair. They remain in the nest for at least two months. A second litter is sometimes brought forth in July or August.

Instead of systematically storing a supply of food for winter use as is generally supposed, the gray squirrel will in the autumn bury quantities of nuts and acorns under the leaves, and in the winter numerous holes in the snow will be found where they have dug down after the buried treasure. In searching upon the snow-covered ground for hidden nuts, a squirrel moves slowly with the head held close to the snow, and then suddenly starts digging, and rarely without success. The sense of smell in these creatures is exceedingly acute and they probably locate the concealed nut by smell, and not by remembering the precise spot where each nut was buried.

During very severe weather this species is rarely seen abroad, as they confine themselves to their snug retreats in hollow trees, venturing forth only during mild spells and generally just before a storm.

If unmolested, the Gray Squirrel soon becomes very tame and will even seek the habitation of man in preference to making his home at a distance. Recently a brood was raised in a large chestnut tree within twenty feet of the door of my house. In Central Park, New York City, they have become semi-domesticated and have grown so tame that if offered a peanut or other dainty morsel, some individuals will make so bold as to take the proffered food from the fingers. It may be of interest to note that the eating of roasted peanuts is an acquired habit with the "city squirrels." During the winter of 1899 and 1900, I fastened a small box without a cover to the body of a tree near my house and kept it supplied with various kinds of nuts. The squirrels readily ate chestnuts, walnuts, and other nuts, but would not touch roasted peanuts, preferring rather to hunt for other food in the snow.

Sciurus ludovicianus vicinus *Bangs*. NORTHEASTERN
FOX SQUIRREL.

This Fox Squirrel was probably a common inhabitant of Westchester County in former times but is now extinct here.

Dr. Merriam⁹, quoting Dr. J. Bachman, who wrote in 1839, speaks thus of it, 'In the northern part of New York it is exceedingly rare, as I only saw two pairs during fifteen years of close observation. In the lower part of that state, however, it appears to be more common, as I recently received several specimens procured in the County of Orange.' DeKay⁵, 1842, states that its habits and distribution are the same as those of *S. c. leucotis*.

I have never seen a specimen of this Squirrel from this vicinity and the only record I can find is one given by Dr. Fisher⁶ in his list of Sing Sing mammals (p. 197) who says, 'Mr. Gilbert C. Merritt once informed me that he had killed several Fox Squirrels in the Chappaqua hills about the year 1850. Of late none have been heard of even in that wild region.'

Tamias striatus (*Linnaeus*). SOUTHEASTERN CHIPMUNK.

This familiar little rodent is everywhere common in the county, but its numbers are subject to great periodical fluctuations. For a number of years they may be fairly numerous and then for a period of several years few if any Chipmunks will be seen.

The Chipmunk is less arboreal in its habits than any of the other squirrels found here, and constructs an underground burrow in which it spends the greater part of its time. It is in this species that we find the industrious habit of storing up a winter's supply of nuts most fully developed and by means of the cheek pouches with which it is provided, it is better adapted for collecting its winter hoard of eatables. Chipmunks continue to collect food until cold weather has set in, when they retire to their burrows, where they pass the

winter in a state of semi-hibernation. They take nourishment and do not become torpid like the Woodchucks, but they never come out except in long-continued mild weather.

I have excavated a number of Chipmunk burrows and find they are all made on the same general plan. The nest, composed of broken dry leaves, is placed in the central apartment or living room which may be eighteen inches long by twelve in diameter. Opening into this are several other chambers or pockets which are used as store-rooms for food and one of them is generally used for shucks or shells and excrement. The original entrance to the burrow, rendered conspicuous by more or less loose dirt about it, is generally closed when the burrow is completed and the permanent entrance, situated at some distance from the first opening, is a clean round hole. A burrow which I dug out on the 10th of May, contained five young ones more than one-half grown. They sat up and ate chestnuts greedily, although their eyes were not yet open. The pockets of this burrow contained about a peck of chestnuts, cherry-pits, and dog-wood berries. The berries were fresh and sweet, but the chestnuts showed signs of sprouting.

Arctomys monax (*Linnaeus*). WOODCHUCK.

I find no early historical records for this rodent, the largest now inhabiting Westchester County; but this is not surprising as the Woodchuck has probably always been regarded as vermin and of no practical economic value. In the extreme lower part of the County, now quite thickly settled, the animal is becoming rare.

The Woodchuck makes his home chiefly in the neighborhood of open meadows, where he constructs a burrow. The mounds of earth at the entrance to a "Woodchuck hole" are familiar objects to almost everybody. Being rather shy and having a wholesome fear of the house dog, the Woodchuck seldom ventures far from his burrow, which he immediately

seeks upon the first intimation of danger. He spends the greater part of the day within the confines of the burrow and ventures forth to feed chiefly in the early hours of the morning and in the evening, and thus becomes excessively fat. I know of a Woodchuck skin from an individual killed during the latter part of summer, which was so thickly coated with fat that when tacked to the side of a barn it dripped oil on warm days, two years later. The tendency to development of excessive fatness in the Woodchuck is however a part of Nature's programme in fitting the animal for existence during the winter, and the fat is really a supply of fuel for future use.

About the middle of September at the first indication of frost, the Woodchuck retires to the depths of his burrow and promptly enters into his long winter's sleep, not again to awaken until spring has come and Nature once more bids adieu to cold weather.

Sciuropterus volans (*Linn.*). SOUTHERN FLYING
SQUIRREL.

The Flying Squirrel is the most strictly nocturnal of our squirrels, rarely leaving its nest in the hollow tree until the dusk of evening. For this reason comparatively few of them are seen; although their presence is made known, especially on still autumn nights, by their oft-repeated squeaks. The flaps of loose skin extending along the sides of the body from the front to the hind paws, together with its extreme proportionate lightness, and flat tail, enable this little rodent to perform its prodigious parachute-like leaps from the top of one tree to the base of another at some distance. He will proceed in this way in preference to leaping from bough to bough like other squirrels. He is more or less carnivorous, and I have known him to gnaw the edges of meat hung from the rafters of an out-house. Like his relatives the true squirrels, the Flying Squirrel, if unmolested, will take up his residence near the habitation of man; and a box that I have tacked

upon the side of a barn for the accommodation of the House Wren (*Troglodytes ædon*), is occasionally taken possession of by this species.

Castor canadensis *Kuhl.* AMERICAN BEAVER.

The abundance of vegetation, and the presence of great numbers of swiftly running streams with which almost the entire county is intersected, formerly offered most desirable conditions for the existence of the Beaver,—once so abundant here and now completely extirpated, not only in this county but probably in the entire state. Frequent mention is made of Beavers in works relating to the early settlement of these parts. They were in great numbers, and so steady and reliable an article of commerce were their pelts that a recognized price or value existed, and they formed a medium of exchange in trade. As late as 1674 beaver pelts were sometimes mentioned as the consideration in the transfer of a tract of land instead of money (Doc. Hist.¹² p. 608); and in every sense were treated as currency—a proceeding that would lead to no little inconvenience with the present state of affairs in Wall-st.

As testimony of the incredible numbers of Beavers that formerly lived here, I quote at second hand Van der Donck, the Patroon of Yonkers, who, writing in 1656, says (Bolton⁴, pp. 29 and 30): ‘This timid animal always constructed its dwellings over running streams, having apertures in the lower stories which communicated with the water from which they could more easily retreat under water to places of safety which they have always prepared near their houses; these consist of a hollow or hole entwining under water from the side of the stream whereon their house was erected, and adjoining under the bank into which they retreat on the approach of danger. * * * Eighty thousand beavers were killed annually during his residence of nine years in the New Netherlands.’ As a last record of the existence of a Beaver in this county, I quote

the following from Bolton⁴: Between two and three miles northwest of the village of South Salem lies Lake Wacabuck (Long Pond) a beautiful sheet of water covering over two hundred and twelve acres of ground. * * * Lake Wacabuck was once famous for the abundance of its beavers. It is upwards of fifteen years since, that the last solitary hermit was observed upon the edge of the lake. This animal had been noticed at different intervals throughout the summer of 1832. In the fall of that year a laboring man (residing near the lake) determined upon securing it if possible. For this purpose he took his station early one morning in the vicinity of one of the Beaver's haunts. It soon made its appearance, and commenced felling a small tree, which it drew to the water's edge; but the man, who had refrained from firing in order to watch the motions of the animal, making a slight noise, it became alarmed, and suddenly plunged into the water. It is said that the same animal was observed in the fall of 1837.'

Mus musculus *Linn.* HOUSE MOUSE.

Like the two preceding species and the English Sparrow (*Passer domesticus*), this is another importation for which the nation has no reason to feel proud. Its depredations about the house and in the fields are too well known to require further comment.

Mus decumanus *Pallas.* HOUSE RAT.

This is the common rat of the county and seems to have been introduced here from Europe during the Revolutionary War (DeKay⁵). It has since spread with wonderful rapidity, adapting itself to circumstances wherever found, be it in the house or in the fields.

Mus rattus *Linn.* BLACK RAT.

The Black Rat, now probably extinct in Westchester County, was the first to be introduced here from Europe and

at one time was very abundant. It was established here about 1544 (Baird², p. 440), and has since been driven out by the preceding species. I quote from Mr. Miller's¹⁰ list, (pp. 314-315): 'I have never seen the black rat in New York. Many of the older inhabitants at Peterboro, Madison County, have told me of the immense numbers in which the 'blue rats' or 'barn rats' once occurred. To judge from these accounts, which I consider trustworthy, this animal must have been more abundant than its successor, the house rat. Mr. Hiram Wilson of Oneida, Madison Co., writes me, under date of February 3, 1898, that he first saw the brown rat (*Mus decumanus*) when his family moved to Oneida Valley in 1837. Previously the Wilsons had lived near Peterboro (about 12 miles distant) where only the black rat occurred.' DeKay⁵, writing in 1842, says: 'It is now exceedingly rare.' Two specimens of the Black Rat were taken in All Souls Church, 66th-st. and Madison-ave., New York city, on April 11, 1893, and are now in the collection of the American Museum of Natural History. I have never met with a specimen from Westchester Co.

***Peromyscus leucopus noveboracensis* (Fischer).** NORTH-EASTERN WHITE-FOOTED MOUSE.

The White-footed Mouse, or "Deer Mouse" as it is sometimes called in this neighborhood, is one of the most abundant mammals of the county. It inhabits woods and thickets and is rarely found far from them, but it sometimes enters houses after the manner of the House Mouse and, being an expert climber, helps itself to the best the house affords.

***Microtus pennsylvanicus* (Ord).** COMMON MEADOW MOUSE.

The Meadow Mouse, as its name implies, is found most commonly throughout the county in low wet meadows along the borders of streams. It is probably much more

common now than in early times, by reason of the clearing away of the forests. In the fall these mice seek the cornfields in great numbers and there do considerable damage to the shocks of corn, especially if they are left standing for a long time. As these mice move about by day as well as by night they are the prey both of hawks and of owls, vast numbers of them being killed.

***Microtus pinetorum scalopsoides* (Aud. and Bach.).**

NORTHERN PINE MOUSE.

The Pine Mouse is occasionally found here and lives chiefly on dry hillsides overgrown with long grass and cedars. Its habits are probably very much the same as those of the preceding species. On May 10, 1898, I received a female and nest of four young from a farmer who unearthed them while ploughing. I have frequently taken them from the house cat, but have never caught one in a trap.

***Fiber zibethicus* (Linn.).** MUSKRAT.

The periodical persecution by trapping to which this formerly abundant animal is subjected, is beginning to tell upon its numbers in the lower part of the county. Here the Muskrat no longer builds houses except where unmolested and in very retired situations, but lives almost entirely in the burrows which it constructs in the banks of streams and ponds.

In the upper parts of the county, this small beaver-like rodent is still found in considerable numbers and is extensively trapped for its fur, and a prime pelt is worth at the present time about fifteen cents.

The usual method of trapping is with a steel trap, placed in the margin of the water at the entrance to the burrow or landing place of the animal. The chain attached to the trap is of sufficient length to permit the entrapped animal to flounder off into deep water, where it soon drowns, but unless

there is sufficient depth of water to permit of complete submersion, the Muskrat if caught by a fore foot, will almost invariably break loose, leaving only its foot remaining in the trap.

The Muskrat is frequently seen swimming about by day but is essentially nocturnal in habit.

The name "Muskrat" is obviously applied to the animal because of the musky oil which the glands secrete; and this secretion so strongly permeates the entire anatomy that a piece of flesh cut from any part of the body will be found to savor strongly of this essential oil. The flesh is eaten by some people, but unless very much disguised in the cooking, the musky flavor is so strong as to be extremely disagreeable. I am informed that a "professional" Muskrat trapper who fed his fowls during the winter largely upon the carcasses of Muskrats, the following spring found that the eggs were so strongly impregnated with the musk as to be unmarketable.

Zapus hudsonius (*Zimmermann*). MEADOW JUMPING MOUSE.

The Jumping Mouse is by no means common in the lower portions of the county, and I have never taken a specimen farther south than White Plains. I have made repeated inquiry among farmers and others in the neighborhood of Hastings concerning this species, but they confound it with the White-footed Mouse so that data gained in this way has always proven unreliable.

Dr. Fisher⁶ reports them as 'tolerably common' at Sing Sing.

Lepus floridanus mallurus (*Thomas*). SOUTHEASTERN
COTTONTAIL. RABBIT.

Two races of Cottontails are said to occur in eastern New York—a northeastern form, *transitionalis* ranging from southern New York, northward and a southeastern form, *mallurus* from southern New York, southward (Bangs³). In

this district intermediates prevail. Two specimens from Hastings which were examined by Mr. Bangs were pronounced by him to be intermediates, but trending toward *mallurus*. Mr. Miller, in his list of New York mammals quotes Dr. Fisher (who records '*L. sylvaticus*,—common') as having taken both forms at Sing Sing. The status of the Westchester Cottontail is therefore in doubt, with the weight of present evidence in favor of *mallurus*.

When one considers the persecution to which this timid animal is subjected by its numerous enemies and the comparatively long period of time for which the helpless young lie exposed in the nest trusting only to concealment for safety, it is surprising that this creature should be so common as it now is, even in the lower part of the county. Mention of some of its enemies in this section will perhaps more fully emphasize the truth of the above assertion. By day and by night, and at all seasons of the year, the Rabbit must exercise constant vigilance, for at least four species of hawks, two of owls, two species of foxes, the skunk, mink, weasel, dog, cat, and — last, but not least — the blood-thirsty ferret manipulated by the sportsman. Besides these enemies the young are subject to the attacks of snakes and many are killed accidentally by the mowing machine or the scythe. To make up for the numbers yearly slain, nature has rendered them extremely prolific, two and sometimes three litters being brought forth each year, the number in a litter varying from four to nine.

The Cottontail is the only hare now inhabiting this county. It is probable that the Varying Hare (*Lepus americanus virginianus* (Harlan)) formerly existed here, but it has disappeared with the clearing away of the heavy forest. In Sullivan County where much of the evergreen timber has been removed to furnish bark for the tanneries, the Cottontail has gradually taken the place of the Varying Hare and where twenty-five years ago the former was unknown it is now very abundant, while the latter has become correspondingly scarce.

Felis oregonensis hippolestes (*Merriam*). NORTHEASTERN
PANTHER.

In early times, the Panther was probably as numerous here as it was anywhere within its range; the vast herds of deer at that time forming a never-failing supply of food for this great cat.

De Kay⁵ states, p. 48: 'The Cougar or Painter (a corruption of the word Panther) is now rarely seen in the southern parts of the State; though the writer remembers when a boy, the consternation occasioned by the appearance of one of these animals in Westchester Co., not more than twenty-five miles from New York.' The Panther has long since been extirpated in Westchester Co.

Dr. Merriam⁹, writing of their occurrence in the Adirondack region, in 1882, says (Vol. I, p. 30): 'A few still remain, and some years may yet elapse before the last panther disappears from the dense evergreen swamps and high rocky ledges of this wilderness.' The last Panther killed in the State, of which I find a record, was taken in the Town of Day, Saratoga County, Jan. 6, 1890, by A. P. Flansburgh (Miller¹⁰, p. 338).

Lynx ruffus (*Guelldenstaedt*). WILDCAT. BAY LYNX.

The Wildcat was formerly a very abundant inhabitant of this district. A steep, rocky bluff on the Tuckahoe road in the town of Yonkers is still known as the 'Cat Rocks,' and received its name from the numbers of these animals which formerly resorted to it. (Bolton⁴, p. 490.)

Van der Donck assures us 'these animals had skins resembling that of a lioness and not unlike them in form, with the exception of short tails like a rabbit or hare.' Dr. Mearns⁷ (p. 351) states that in the early seventies, Wildcats, by their depredations, caused so much loss to the residents of Putnam Co. (adjoining Westchester on the North) that bounties were

privately subscribed by landowners amounting to \$25.00 for every one killed in that neighborhood.

The last record for the county seems to be that given by Dr. Fisher⁶ in his list of Sing Sing mammals, who says: 'The last one killed in the neighborhood, as far as we know, was shot by a Mr. Reynolds at Katonah, in March, 1880.'

It is possible that a few individuals still linger in the northern parts of the county.

It may be that in early times the Northern Lynx (*Lynx canadensis* (Kerr.)), occasionally came down into the northern portions of Westchester Co., for Dr. Mearns⁸ (p. 351) has recorded it as late as 1878, from the vicinity of Rhinebeck on the Hudson River.

***Urocyon cinereoargenteus* (Schreber). GRAY FOX.**

The Gray Fox (in this district sometimes erroneously called the 'Silver Gray') is about as common as the Red Fox in the southern portion of the county. It generally selects a rocky, timbered ridge for its haunts. It is not so fleet of foot nor so sagacious as the Red Fox and will never lead the hounds upon so long a chase. It frequently makes but a few short circles and then retreats to its den in the rocks, after the habit of the Cottontail.

It has been asserted that the Gray Fox will sometimes climb trees when hard pressed by the dogs. I know of but one instance of the occurrence of this feat and then the tree climbed was one partially fallen which had lodged in the fork of an adjoining one, so that the trunk was lying at an angle. This fox is an expert mouse catcher and I have frequently started one from the long grass of a meadow where he had been quietly mousing during the day.

He sometimes shows little fear of man, as I have occasionally started one in the long grass only to have him run off a short distance, quietly turn round and survey me for several moments and then finally make off.

In the fall of 1892, while quail hunting in a place known as "Meadow Hollow" in the neighborhood of Kensico, I shot several quail as they rose in succession. Afterwards in searching for the fallen birds, I observed an animal dodging through the tall grass, which I at first took to be one of my dogs. But following it with my eyes I saw it finally emerge on the edge of the swamp and to my surprise it proved to be a Gray Fox and in his mouth a quail, which was probably one of my dead birds.

***Vulpes fulvus* Desmarest. RED FOX.**

The reputation which the fox has possessed from time immemorial is perhaps a sufficient apology for his presence among us at the present day. Being fleet of foot, chiefly nocturnal in habit, and exhibiting great sagacity when pursued by hounds or when an attempt is made to trap him, the Red Fox will probably exist in the county for many years to come. At the present date he continues his noctivigations even within the limits of the city of New York. In the central portion of the county the Red Fox is still probably as abundant as anywhere within the state, and keeps up his reputation as a thief by varying his usual diet of mice, rabbits, etc., with an occasional fowl stolen from the poultry yard. This propensity for robbing the hen roost seems to be greater in this species than in the preceding and prevails chiefly when the young are being raised. At this period the entrance to the fox burrow presents somewhat the appearance of an open-air burial ground for birds and mammals. I have seen the remains of numbers of ducks, chickens, hares, woodchucks, and even skunks collected for the consumption of the young foxes.

I have never met with the black phase of this fox in Westchester County.

Canis occidentalis (*Richardson*). TIMBER WOLF.

During colonial times wolves were so abundant in the county and became so great an enemy of the stock raiser that rigid laws and bounties were provided for their destruction. Thus we find among Acts of Colonial Assembly of N. Y., p. 47 (Bolton⁴, p. 121) the Provincial Assembly compelled to issue the following order, entitled, 'An act for destroying wolves within this colony: Forasmuch as divers inhabitants of this colony have suffered many grievous losses in their stock, both of sheep and neat cattle, for the prevention of which and encouragement of those who shall destroy wolves in the said colony, and that the breed of wolves within the colony may be wholly rooted out and extinguished, be it enacted etc., that in the County of Westchester there be paid twenty shillings for a grown wolf killed by a Christian, ten shillings for such a wolf killed by an Indian, and half that sum respectively for a whelp.' In this State, the wolf is now confined to the Adirondack region where a few still remain. The last ones killed there of which I have any knowledge were four taken in Lewis Co. and two in St. Lawrence Co., in 1897, by George Muir (Miller¹⁰, pp. 144-145).

In Westchester County the Wolf was exterminated in the early part of the past century. The last record so far as I have been able to ascertain, was that of a single individual which was killed in 1806, in 'Wolf Swamp,' at the source of the west branch of the Sprain River, a once famous resort for these animals. (Bolton⁴, p. 490.)

Ursus americanus *Pallas*. BLACK BEAR.

I have been unable to find any published record of the occurrence of the Bear in this county, but there is no doubt that during early times they were very common.

De Kay⁵ says: 'The Bear, once so numerous in this state,

is now chiefly to be found in the mountains and thinly inhabited districts.'

It still occurs in the Catskills, and in the Adirondack region they are quite common.

I have seen a portion of the lower jaw of a bear which was excavated from a shell heap at Throgg's Neck, this County, by Mr. M. R. Harrington of the American Museum.

***Lutra canadensis* (Schreber).** NORTHEASTERN OTTER.

Being an exceedingly shy animal and disappearing rapidly from inhabited districts, the Otter, once so common in every part of the county, is now probably extinct here. As evidence of their former abundance, I quote at second hand from Wassanaer's *Historie van Europa* Amsterdam, 1621-32 (Doc. Hist.¹² Vol. III. p. 37) a passage from the 'Description and First Settlement of New Netherland': 'As regards the prosperity of New Netherland, we learn from the arrival of the ship whereof Jan May of Hoorn was skipper, that everything there was in good condition. * * * The fur or other trade remains in the West India Company, others being forbidden to trade there. Rich beavers, otters, martins, and foxes are found there. This cargo consists of five hundred otter skins and fifteen hundred beavers. * * * The tribes are in the habit of clothing themselves with them; the fur or hair inside, the smooth side without, which, however, they paint so beautifully that, at a distance, it resembles lace.'

Mr. Samuel Rowley informed me that when trout fishing he saw an Otter on several occasions in 1858, on the Sprain River in the lower part of the county. The great numbers of trout with which this stream abounded probably offered a special inducement to the Otters to linger there. The Otter is still found in the Highlands on the west bank of the Hudson and I have recently received a specimen killed at Poplophen Pond in that region, by Mr. John Redner. The last date of which I have any knowledge of the capture of an

individual in this county was at Pound Ridge during the winter of 1890, when Mr. George Isaacs secured a specimen and stated that others were occasionally caught there.

***Mephitis mephitis* (Shaw). SKUNK.**

The Skunk is one of the most common mammals of the county. It is probably much more so now than formerly, since the forest land has been converted into farms. In the Province of New Brunswick, Canada, I found the Skunk not uncommon about the settlements, but never met with it in the deep forests. It seems to prefer to take up its residence somewhere near the abode of man, where a convenient hen-house or garbage barrel affords him a variety of dainty morsels with which to vary his usual diet of insects, grubs, and birds' eggs.

The Skunk is much trapped for its fur in this district. There is wide variation in the color pattern and skins range in value from 40 cents to \$1.25, according to the extent of the white stripes, the black skunk being the most valuable.

Skunks, although capable of excavating entire burrows usually frequent in this neighborhood old and deserted Woodchuck holes; in some cases remodeling the interior to suit their individual fancy.

They propagate rapidly in captivity and I recently read of a "skunk farm" which was located in Livingston Co., N. Y., where they were raised exclusively for their pelts (Warner¹¹).

***Putorius vison lutrecephalus* (Harlan). SOUTHEASTERN MINK.**

The Mink is still common in the county in suitable situations and is extensively trapped for its fur, which is one of the most valuable now harvested here. A prime mink skin taken here is now worth from 50 cents to \$1.50, according to size and color, but the price is subject to periodical fluctuation. This is not owing to any variation in the supply of mink fur,

but to the changes in the fashions of women's garments. Although the Mink is essentially a nocturnal animal, it is frequently seen abroad by day. In common with the Skunk and Weasel this species is equipped with scent sacs at the root of the tail and when much irritated by its enemies emits a most intolerable and penetrating odor.

Putorius noveboracensis *Emmons*. NEW YORK WEASEL.

This Weasel is probably as common in the county now as it ever was. Like its distant relative the Skunk, the Weasel prefers to live in the neighborhood of the farm; where mice and stone walls affording highways to and from foraging expeditions, offer special inducements. They occasionally take up their residence under a barn or outbuilding, and no greater mistake can be made by the proprietor than to destroy them; for the continued presence of a Weasel on the premises is evidence that numbers of mice and rats are slain daily.

I have taken a few winter specimens white in color, but they commonly remain brown throughout the year in this district.

I have never seen nor heard of a specimen of the smaller weasel (*Putorius cicognani*) from Westchester Co., although Dr. Mearns has recorded it from the Highlands, and it has been taken on Long Island (Miller¹⁰, p. 352).

Procyon lotor *Linn.* RACCOON.

The Raccoon is one of the most common of the larger mammals of the county; and there is scarcely a stream of any great length, even in the thickly populated districts, upon the shallows and sand-bars of which tracks of these animals may not be seen at the proper season. The strictly nocturnal habits and sagacity of the 'coon' probably stand between it and extermination for many years to come. From the habit which these animals possess of traveling in shallow

water and invariably taking to a stream if leading in the direction in which they wish to go, they are not likely to be tracked to their hiding places by dogs. So well aware of this fact do the 'coons' seem to be that I know of one that actually brought forth and raised a litter of young between the roof and ceiling of an outhouse, which was built over a stream leading away to the woods, in the village of Dobbs Ferry, within a few rods of the main road, Broadway.

Like the bear, the Raccoon passes the depths of winter in a state of hibernation and emerges from his retreat about the middle of March in this locality, well rid of the good store of fat with which nature had supplied him.

The Raccoon is still hunted and trapped quite extensively in the county, both for sport and for its skin. The hunting is usually done at night with the aid of one or more dogs. The dogs are permitted to range through the swamps until their excited barkings announce to the hunters that the 'coon is treed.' He is usually shaken from the tree to be killed by the dogs below, or is dispatched with a gun shot. In trapping, a steel-trap is set under water in shallow places in a brook or ditch, and unless the trap is so placed few if any of the animals will be taken. In populous districts where they are much persecuted by the combined efforts of dog and man, they adapt themselves to circumstances and take up their abode permanently in "blind drains" i. e. covered ditches, where they are free from attack. They even pass the winter there in preference to risking themselves in the usual hollow tree.

***Phoca vitulina* Linn. HARBOR SEAL.**

During the winter of 1889, when the river was full of floating ice, I remember having seen a seal in the Hudson River opposite Hastings, but have neither seen nor heard of any since. Dr. Fisher⁶, writing in 1896 (p. 200) says: 'Almost every spring one or more seals are seen about the

time the ice is breaking up in the river. On March 11, 1884, an adult male was secured in the Cove.'

In Long Island Sound this Seal is occasionally seen during the winter. I have seen the skin of one that was shot near Rye Beach during the winter of 1897 by Mr. John Farrel, who then resided at Hastings. In winter I have seen numbers of seals in Lower New York bay, where they are called 'Sea Dogs.' It is probable that in early times they regularly ascended the Hudson River and were common every winter.

Cystophora cristata (*Erxleben*). HOODED SEAL.

I quote the following from Mr. Miller¹⁰ (p. 357): 'The hooded seal has been taken in New York on one occasion only. It is a mere straggler to the coast of the United States, though it has been known to wander as far south as Chesapeake Bay.' DeKay⁵ says (p. 56): 'This description was taken from an adult male captured near Eastchester about fifteen miles from the city.'

Sorex personatus *I. Geoffray St. Hilaire*. MASKED SHREW.

Personally, I have never met with the Masked Shrew in Westchester Co., and include it in my list on the strength of Dr. Fisher's⁶ Sing Sing records. He says (p. 194): 'The common shrew is rather rare and is the only one of the long-tailed species found in the neighborhood. Its scarcity, however, may be only apparent, and due wholly or in part to our lack of skill in former days, in trapping it successfully. The majority of specimens were secured from birds of prey. On one occasion, April 18, 1885, two were found in the stomach of a red-tailed hawk.'

Blarina brevicauda (*Say*). SHORT-TAILED SHREW.

This is the common shrew of Westchester County found both in the woods and in the fields. They breed exclusively

in burrows constructed under ground, and the nest is in many cases placed underneath a decayed stump. I have excavated a number of burrows and have found in some instances a nicely constructed nest of broken up leaves. Numbers of snail shells were found in some of the burrows, the bottoms of the shells having been eaten away and the tenant missing, presumably devoured by the shrews. They probably breed quite late in the season, or else have several litters, as two females which I opened on May 27, 1898, contained half-grown embryos.

Scalops aquaticus (*Linn.*). NAKED-TAILED MOLE. COMMON MOLE. GROUND MOLE.

This quiet subterranean dweller is abundant in all parts of the county and makes his presence known by his 'hills' or 'tracks' which are thrown up in the gardens and lawns. The mole displays his greatest activity during the early hours of morning and evening or soon after a shower succeeding a prolonged draught. Although he is strictly insectivorous in his diet and therefore a friend to the agriculturist, the methods he uses to procure his food render him a pest, and as such his life is generally sought for by the gardner.

A female which I opened on April 24, 1898, contained four half-grown embryos.

Condylura cristata (*Linn.*). STAR-NOSED MOLE.

This species of mole is not nearly so common in the county as the preceding and is confined chiefly to low swampy situations.

I have never taken a specimen in the neighborhood of Hastings, but have seen several from the vicinity of the Fair Grounds near White Plains, where the land is flat and damp.

Myotis lucifugus (*Le Conte*). LITTLE BROWN BAT.

I have never met with this bat from Westchester County, and record it on the strength of one specimen taken at Sing Sing, N. Y., by Dr. Fisher⁶, who says (p. 195): ‘Out of the hundreds of bats collected only one of this species was ever secured, which was on June 9, 1884.’

Myotis subulatus (*Say*). SAY’S BAT.

I have never taken Say’s Bat at Hastings, but on June 11, 1893, a number of both young and old were found hanging to the rafters of the railroad station at Elmsford, this county, and are now in the collection of the American Museum, where they have been identified by Dr. J. A. Allen as being of this species.

Lasionycteris noctivagans (*Le Conte*). SILVERY BAT.

The Silvery Bat is tolerably common in the county and I have found them flying about in openings in the woods just before dusk. All the specimens I have ever secured have been taken in such situations.

Pipistrellus subflavus (*F. Cuvier*). GEORGIA BAT.

The Georgia Bat is common in the vicinity of Hastings and is found chiefly flying about over the water at night. Dr. Fisher⁶ states that this is the commonest bat at Sing Sing. There is one specimen in the collection of the American Museum labeled “Hastings, Westchester Co., N. Y., May 22, 1893.

Vespertilio fuscus *Beauvois*. BROWN BAT.

The big Brown Bat is found at Hastings but is not nearly so common as the Georgia Bat.

Lasiurus cinereus (*Beauvois*). HOARY BAT.

I have never taken the Hoary Bat in Westchester Co.

Mr. E. B. Southwick of New York City showed me two specimens which he secured in Central Park.

Mr. Eugene P. Bicknell has recorded it from Riverdale, this county, where he took one which was hanging from a branch, on Sept. 30, 1878. (Merriam⁹, Vol. II, p. 81.)

Lasiurus borealis (*Müller*). RED BAT.

This is by far the commonest bat at Hastings, and may be observed during summer evenings flying back and forth in search of insects, along lanes or in open spaces between rows of trees or patches of timber.

**A. — LIST OF SPECIES FOUND IN WESTCHESTER COUNTY
FOR WHICH THERE ARE ACTUAL RECENT RECORDS.**

| | |
|-------------------------------------|------------------------|
| DIDELPHIS VIRGINIANA. | Opossum. |
| PHOCÆNA PHOCÆNA. | Harbor Porpoise. |
| TURSIOPS TURSIÖ. | Porpoise. |
| SCIURUS HUDSONICUS LOQUAX. | Red Squirrel. |
| SCIURUS CAROLINENSIS LEUCOTIS. | Gray Squirrel. |
| TAMIAS STRIATUS STRIATUS. | Chipmunk. |
| ARCTOMYS MONAX. | Woodchuck. |
| SCIUROPTERUS VOLANS. | Flying Squirrel. |
| MUS MUSCULUS. | House Mouse. |
| MUS DECUMANUS. | House Rat. |
| PEROMYSCUS LEUCOPUS NOVEBORACENSIS. | White-footed Mouse. |
| MICROTUS PENNSYLVANICUS. | Meadow Mouse. |
| MICROTUS PINETORUM SCALOPSOIDES. | Pine Mouse. |
| FIBER ZIBETHICUS. | Muskrat. |
| ZAPUS HUDSONIUS. | Jumping Mouse. |
| LEPUS FLORIDANUS MALLURUS. | Cotton-tail or Rabbit. |
| LYNX RUFFUS. | Wildcat. |
| UROCYON CINEREOARGENTEUS. | Gray Fox. |
| VULPES FULVUS. | Red Fox. |

| | |
|--------------------------------|---------------------|
| LUTRA CANADENSIS. | Otter. |
| MEPHITIS MEPHITICA. | Skunk. |
| PUTORIUS VISON LUTREOCEPHALUS. | Mink. |
| PUTORIUS NOVEBORACENSIS. | Weasel. |
| PROCYON LOTOR. | Raccoon. |
| PHOCA VITULINA. | Harbor Seal. |
| SOREX PERSONATUS. | Masked Shrew. |
| BLARINA BREVICAUDA. | Short-tailed Shrew. |
| SCALOPE AQUATICUS. | Common Mole. |
| CONDYLURA CRISTATA. | Star-nosed Mole. |
| MYOTIS LUCIFUGUS. | Little Brown Bat. |
| MYOTIS SUBULATUS. | Say's Bat. |
| LASIONYCTERIS NOCTIVAGANS. | Silvery Bat. |
| PIPISTRELLUS SUBFLAVUS. | Georgia Bat. |
| VESPERTILIO FUSCUS. | Brown Bat. |
| LASIURUS CINEREUS. | Hoary Bat. |
| LASIURUS BOREALIS. | Red Bat. |

Total number of species now found — 36.

**B.—SPECIES RECORDED WITHIN HISTORIC TIMES WHICH HAVE
SINCE BEEN EXTIRPATED.**

| | |
|--------------------------------|------------------|
| ODOCOILEUS AMERICANUS. | Virginia Deer. |
| SCIURUS LUDOVICIANUS VICINUS. | Fox Squirrel. |
| CASTOR CANADENSIS. | American Beaver. |
| MUS RATTUS. | Black Rat. |
| FELIS OREGONENSIS HIPPOLESTES. | Panther. |
| CANIS OCCIDENTALIS. | Timber Wolf. |
| URSUS AMERICANUS. | Black Bear. |
| CYSTOPHORA CRISTATA. | Hooded Seal. |

Total number of species extirpated — 8.

C.—FOSSIL SPECIES RECORDED.

| | |
|----------------------|----------------|
| MASTODON AMERICANUS. | Mastodon. |
| CERVUS CANADENSIS. | Elk or Wapiti. |

Total number of fossil species — 2.

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Some Food Birds of the Eskimos of Northwestern Greenland.

BY J. D. FIGGINS.

POSSIBLY at no other place on the globe are birds so extensively used for food and clothing, as they are in north Greenland. A portion of this bleak and barren coast is inhabited by a small tribe of Eskimo, commonly known as the Arctic Highlanders, consisting of about 250 individuals, and divided into seven or eight settlements. Through force of circumstances these natives are strictly carnivorous and a large supply of meat is required, not only for their personal use, but for their numerous packs of sledge dogs. Seals and Walruses are the animals most hunted in order to obtain food, but they are not to be depended upon entirely, as it is impossible in some years, to secure the necessary numbers. Caribou are not common, and are very hard to obtain. Narwhals are taken during the early spring, but usually in very limited numbers and they make only a slight change in the usual bill of fare. Whenever there is a shortage of Seals and Walruses,—and this occurs often—the natives depend almost entirely upon birds. Seals and Walruses often desert a locality for a year or two, and to be prepared for this the natives locate their villages as near bird rookeries as possible, regardless of unfavorable conditions. The stupidity of the birds renders them an easy prey for the hunters whose methods of capture are very simple. As soon as the birds arrive in the spring the harvest begins, and ceases only when an abundance of other game is assured.

While at Cape York during the summer of 1896, I was invited by a party of native hunters to accompany them on an expedition to the great rookery of Dovekies (*Alle alle*) near

that place, and being greatly interested I gladly accepted their invitation. It was a strictly business affair with them, and they requested me to leave my gun behind and take along a net, which, of course, I did. A half hour's row brought us to the foot of a high cliff, the base of which was piled to the height of about two hundred feet with boulders, detached from it by the action of the elements. This mass of loose and treacherous rock — entering the water at an angle of about 45 degrees — was the breeding ground of the Dovekies, and here they were to be captured.

These birds deposit their eggs well down in the crevices among the smaller stones and at the time of my visit the young birds were nearly ready to leave the nests. A curious subdued murmur, made by the plaintive call of the young birds, formed a kind of back-ground of sound for the louder notes of the adults, whose incessant chatter gave abundant proof of the countless thousands breeding at the rookery. Climbing to an altitude of about one hundred and fifty feet we reached the flight zone of the Dovekies, where there was a continuous movement of large flocks, whose sole employment appeared to be flying round and round in circles which extended from within a few feet of the cliff to well out over the water. Consequently to come within striking distance of the birds, it was only necessary to watch a flock, and while they were away on their circuit, to take a position screened from view behind a large rock in their line of flight.

A curiously constructed net is used at present for capturing the birds. It consists of a hoop about two feet in diameter across which a net, slightly bagging, is constructed. The hoop is secured at the end of a light pole about ten feet in length, and when in use the nets remind one very much of lawn-tennis racquets on a large scale, being swept forward with similar strokes. The hunter places the net on the rocks in the opposite direction from which the birds are expected, and on their approach raises it to meet them with

considerable force, which stuns or entangles them in its meshes. The net is quickly drawn to the hunter and the victims secured. A firm, quick pressure under the wings usually causes almost instant death, but to make their capture doubly sure, the wings are crossed on the back which prevents flight in case they survive the deadly pressure. Again the net is placed in position ready for a new strike. The escaping birds of the flock invariably dart aside in unison when the strike is made, but they apparently forget all danger by the time they have again completed their circuit, for they repeat the movement time and time again until their diminished numbers make the casting of the net a labor that is practically without result. A new flock is then selected and the work continued until a sufficient number of birds is secured.

Before the advent of the white man, from whom materials for net making are obtained, a more primitive method was employed, namely, throwing stones, and it is still carried on by the younger generation, with considerable success. Dovekies display great curiosity, and if the hunter sits quietly in full view, he will soon have an audience of them near him, all bent on occupying one rock, regardless of its size or of their numbers. A compact flock of birds soon results, and a well directed stone thrown into their midst does great execution. Stones may be thrown a number of times at the same flock before they decide to adjourn. I experimented with both methods, but found the latter most successful, as I was either too late or too soon with the net, much to the amusement of the natives.

On Saunders Island the method of bird catching is not quite the same, as the birds and conditions are different. The net is used, however, to advantage. At this rookery Brünnich's Murre (*Uria lomvia*) is the principal species taken, although when a very large supply of birds is needed, Kittiwake Gulls (*Rissa tridactyla*) are also hunted. The rookery

is on a perpendicular cliff, rising from the water to a height of several hundred feet, the birds occupying a space about half a mile in length, and from a few feet above high tide to the very top, and every projection of rock is covered with birds, so that standing room appears to be at a premium. Hunting at this rookery is little short of murder, for the stupid birds can be clubbed from their insecure perches or netted by the hundreds. Approaching the cliff in his kayak, the hunter gently presses his net against bird after bird that in its struggles to escape thrusts its head into the meshes of the net which entraps it. Each bird is quickly drawn to the hunter and dispatched, those remaining not being at all disturbed and the space made vacant by one is immediately occupied by another. When the sea is smooth the natives often climb upon the ledges of rock and club the Murres, hundreds being killed in this way in a very short time. The hunters frequently meet with accidents at this rookery for the perpendicular cliff and a heavy swell make 'kayaking' dangerous.

Puffins (*Fratercula arctica glacialis*) and Eider Ducks (*Somateria mollissima borealis* and *S. spectabilis*) are much prized by the natives and are killed by spearing from the kayak. The spear is simply a sharpened rod of iron set into the end of a light shaft. At fifteen or twenty yards the hunter seldom misses his mark. Ptarmigans (*Lagopus lagopus*) are also taken, but in very limited numbers as they are not common. Dovekie and Murre skins are used throughout the tribe for making clothing, and hundreds of them are preserved each year for this purpose. In removing the skin, the wings are cut off near the body, and the skins are cut loose at the base of the neck and stripped over the body. The Eskimo's simple, but effective method for removing all fat and making the skins soft and pliable, is to give them a thorough chewing.

It would be impossible to estimate the number of birds

taken by this tribe each year, even when other game is plentiful, but it must be enormous. Still the birds do not appear to be on the decrease, for the outer edges of the rookery have a new appearance that leads me to believe the breeding area is being extended. A few years ago an epidemic caused the death of a large percentage of the Eskimos and as the food demand was consequently less, the extension of the rookery may have resulted. This, of course, is merely a conjecture, but it seems plausible.

From an economic standpoint the birds of this cheerless Arctic region are in the superlative degree a necessity to the Eskimo, and without them they would long since have perished by famine. That the natives can never exterminate the birds seems assured, for the greater portion of them are inaccessible; and if the great herds of Seals and Walruses become extinct, and even the natives themselves cease to exist, the birds will probably still continue to rear their young among these desolate and rocky surroundings.

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